

The Use and Distribution of Roman Glass at the Villa Site of San Felice,
During Pre- and Post-Imperial Occupation

By
Leena Louise Kilback

A Thesis Submitted to
Saint Mary's University, Halifax, Nova Scotia
in Partial Fulfillment of the Requirements for a
B.A. Honours in Anthropology.

April 2014, Halifax, Nova Scotia

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Date: 19 April 2014

Signature page

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Abstract

The Roman villa at San Felice in southern Italy was inhabited during three distinct phases of occupation. The villa began its life as a privately-owned residence but became property of the imperial *fiscus* and underwent extensive renovations. The use and distribution of glass in the large peristyle villa is examined using material-culture dynamics, qualitative, and quantitative methods in conjunction with an overview of the role glass played in everyday life from the 1st century BCE to the 2nd century CE. The glass fragments recovered during excavation were entered in an electronic database and used to create spatial distribution maps and tables to show how glass use changed over time and discern their possible function. During the occupation of the villa, glassmaking in the Roman period was becoming more advanced with new technological innovations which allowed glass vessels to be easily mass produced. The villa at San Felice was located close to the presumed course of the Via Appia, permitting regional trade and access to glass vessels.

19 April 2014

ACKNOWLEDGEMENTS

I would like to sincerely thank my thesis supervisor Myles McCallum for his patience and guidance during this process, while being on sabbatical in Italy. Thank you to the members of my committee, Paul Erickson and Johnathan Fowler, for their support and help. The Saint Mary's Patrick Power Library was a valuable resource while conducting research and provided access to the majority of my sources, both print and online database access. Thank you to Hans vanderLeest and Tracy Prowse for the opportunity and the experience I gained while working in southern Italy in 2013. Thank you to Jim McCaw for helping me edit my proposal. Finally, a big thank you to the other honours students for their support and camaraderie during the past eight months. I dedicate this thesis to my loving mother, Janice Deveau.

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CHAPTER I: INTRODUCTION

Glass vessels are common and easy to produce today thanks to the technology we have, but glassmaking has been around for centuries. Creating glass vessels by hand requires an oven with a controlled and constant heat source, materials to mix in the correct ratio, and a skilled glassmaker to oversee the process. The vessels created can be used for endless functions in everyday life including serving dishes, storage containers, or medicine bottles. Glass is non-porous, unlike pottery, and does not contaminate its contents, like some metals (copper or lead). This thesis investigates the use and distribution of Roman glass at the villa site of San Felice, in southern Italy, during its three phases of occupation and renovation, specifically examining the change during pre- and post-imperial occupation.

The villa underwent renovations twice during its lifetime, changed in layout and function, and glass fragments were found for all three (see Table 1). The peristyle (an open-air, central courtyard) area showed significant change between the phases, but not much is known about its function. During the final phase of occupation, household waste was sealed in a large midden (garbage deposit) by a wall collapse and is where many of the glass fragments were found. Most of the evidence found at the villa is ceramic because pottery was cheap and discarded at the end of its use-life, but the number of glass fragments may help to provide some insight into the function of its spaces. The majority of the assemblage found in the midden dated to the imperial

occupation at the villa and shows common vessel diameters, which are used to determine a possible shape and function in the household.

	Date Range
Phase 1	Mid-1 st century BCE to last third of 1 st century CE/ early 1 st century CE
Phase 2	Last third to late 1 st century CE/ early 1 st century CE to late 1 st century CE
Phase 3	Late 1 st century CE to mid-2 nd century CE

Table 1: Date range table (McCallum et al. 2011:36).

The western range of rooms is also an important space in the villa because of its residential function and has yielded fragments from all phases of occupation at the villa. These fragments were examined to identify any changes in function in the area between phases. Spatial distribution maps of the glass fragments at San Felice were used for comparing the distribution by phase and showing any changes in the glass assemblage over time.

An analysis of the glass assemblage from San Felice allows us to understand the types of glass vessels used there. It is important to have a general knowledge of glass use and function in Roman Society before making an analysis; therefore, many sources of information were consulted on Roman glass during the time of occupation at San Felice. Useful sources were scholarly articles and books, most importantly museum catalogues with examples of Roman vessels to which fragments from the dataset were

compared. Preliminary examination of the assemblage indicates that glass was used for a variety of purposes at the villa: as both containers and architectural fragments.

Fragments collected from San Felice during excavation were compared to complete Roman vessels found in museum catalogues. This comparison permits an interpretation of the possible function of the glass vessels at San Felice.

Since the villa had a close relationship to the neighbouring *vicus* (village) at Vagnari, glass use would not be confined to the villa. The discovery of glass slag (production waste) at the *vicus* may be indicative of glassmaking and possible recycling activities, supported by access to resources (fuel and sand) to sustain glass production. The close proximity to the *Via Appia* was also a source of trade for all types of products used in daily life, including glass.

The first chapters provide a background of archaeology, methods, theory, and the history and production of glass during the time of occupation at San Felice to better interpret the types of glass that could be found at the site and their possible functions and uses in the household. These sections will familiarize the reader with the techniques and materials used to make glass, possible types and functions of vessels that Roman households might have, and the methods I have employed while interpreting the glass finds at San Felice. The later chapters focus on the distribution and possible use of glass at the villa.

Archaeology

Archaeology is the scientific study of human activity and the material culture people leave behind. It deals with physical remains (or objects) that are used to provide information on the often unrecorded lives and activities of the people in the society being studied (Biers 1992:1).

The study of ancient Greek and Roman cultures is considered a subdivision of archaeology and classics, aptly named classical archaeology. A main source of information about the classical world comes from written sources (Biers 1992:3-4). The sources describe natural and social phenomena (Pliny the Elder's *Natural Histories*), cities and battles (like Caesar's own accounts of conquest in Gaul). Written sources are biased because the author, and intended audience, were mainly the literate upper classes in Roman society.

Stratigraphy and Dating

The glass at San Felice were dating according to the deposit it was found in. The deposit layers were dated using other artifacts collected. Many of the glass fragments are too small or provide too little information to date by shape. Therefore it is not

possible to know the date when the vessel was used or constructed based on only a few fragments.

Archaeological sites are formed by human activity, like habitation, construction, abandonment, destruction and decay, and is recorded in the deposits left behind as strata (Biers 1992:17). These disturbances show up in the dirt as changes in colour and consistency, composition, texture, or a combination of characteristics (Biers 1992:19). These deposits or strata can be dated because of the objects found within them (Biers 1992:19). Relative dating uses the objects in the deposit to assign a date to that section of the soil. Excavation reveals the layers from the top where the most recent artifacts are found, down to the bottom (closest to virgin soil), where the oldest objects sit. The general rule is 'last in, first out' (Biers 1992:18). Construction, looters, modern settlement, awkward natural catastrophe can shift the objects or layers (Biers 1992:19). Some artifacts, like pottery and glass, are datable because of the lifespans of their style or function. This helps to relatively date the layer and give a range of possible dates for other artifacts in the context. Coins are very helpful for obtaining a range of dates because the picture shown on the face is usually one of an emperor who can be identified in the classical records (one of the benefits of ancient sources), and from other examples of coins that are known. Small, heavy objects can sink in soil that is loosely compacted (Biers 1992:19), which highlights the importance of recording soil type during excavation.

Ancient construction can shift layers and the layers themselves can become contaminated by fill brought in from elsewhere for activities such as leveling during

construction (Biers 1992: 19, 23). Other changes that can occur to the stratigraphy include burrowing animals, many of which are known to collect shiny objects and can displace artifacts well away from their original place of deposition (Biers 1992:19).

In the case of San Felice, the earth covering the site is used for cereal agriculture and disturbed by annual ploughing. The relationship of the layers and features is extremely important for learning about a site and discovering its chronology. Objects found during excavation are used to establish a *terminus post quem* (Biers 1992:20), or limit after which the layer could be used before another event changes things.

Relative dating has been used to date the glass fragments at San Felice. While excavating, each locus has its own bucket for fragments, allowing for a reconstruction later of where each fragment was located in the trench. Current work is being done to digitize the records for the site and create a map of the loci over the villa, which allows for a better analysis of the distribution of glass.

CHAPTER II: HISTORICAL AND ARCHAEOLOGICAL CONTEXT

Roman villas were not like urban homes. They were located in the countryside and were concerned with production, and the villa at San Felice was no exception. Glass use depended on access to trade routes and an occupant with enough wealth to spend on various shapes and styles of vessels that were superior in many ways to ceramic or metal. The San Felice villa shows a distinct change in ownership after Phase 1 of occupation when the villa becomes part of an imperial estate, and the glass evidence reflects this.

Roman Villas

The villa at San Felice is one among many in the southern Italian countryside. By the 1st century BCE villas were common in the countryside and participated widely in market exchange (Wacher 2002:528-37). The reign of the villa lasted until the 4th century CE when the destruction of many villas has been documented (Wacher 2002: 545).

A Roman villa is a rural residence generally consisting of several low buildings, areas used for agricultural processing and artisanal activities, and lodgings for servants. Size of villas range from small family farmsteads with a dozen rooms, to large complexes with baths and gardens (Wacher 2002:528). It was common for villas in the Roman provinces to omit the atrium (the entrance room to the house with an *impluvium* in the

centre) and focus on the peristyle instead (Bergmann 2012:233). During the 1st century BCE, peristyle villas became widely popular, and by the 2nd century CE, the peristyle area was important as a sign of the wealth of the occupant (Bergmann 2012:233).¹

The villa's main concern was providing goods for trade. There are two main types of villas in the countryside: the *villa rustica* that was used intensively for processing or artisanal activities; and the *villa urbana* that was known for being a part-time pleasure retreat for wealthy Romans situated near urban centres. Both types of villas had barns, orchards, vineyards, workshops, kilns, pressing facilities, storage facilities, and animal pens attached to the property. From the Republic onwards, successful and wealthy men owned villas throughout Italy and the provinces (Bergman 2012:241). Villas with comfortable residential areas, painted plaster, and high quality pavement reflect a building that was frequently used or lived in by wealthy residents (Wacher 2002:541).

During the Roman period, property ownership and possessions in the home were used to display the wealth and social rank of an individual (Bergmann 2012:228). Evidence for the actual status of the owner, in legal terms, cannot be obtained from villa remains (Wacher 2002:541), unless an inscription is found. Some architectural and material clues that can be used to attach a relative rank in Roman society, such as: the size of the structure, the elaboration of the decorative elements, the size of the residential area, and the presence of a bath complex.

Villas were occupied by many different social classes (local men, immigrants, landlords, slaves) and it is rare to attach a particular family name to private residents at

a site (Wacher 2002:541). The presence of any artifact is subject to individual, societal, and environmental factors and may be present for many reasons (Bergmann 2012:243). Residential areas in Roman homes often had frescoes, pleasurable views when available, and waterworks (Bergmann 2012:242). Wooden and bronze furniture consisted of small tables, couches, chairs, and strongboxes, all of which were very portable (Bergmann 2012:242). Many large rooms were divided up into smaller spaces using tapestries or curtains that were used to regulate light, ventilation, privacy, and access (Bergmann 2012:242).

The Roman villa had multiple functions and was both a residential space for sleeping, entertaining, and eating; and an industrial space, for producing goods for household consumption and surplus for sale or trade. Many outside factors could force the villa's inhabitants to renovate, add, or change spaces. As already stated, change can occur because of a change in ownership. The change at San Felice has been linked to the villa becoming part of the imperial *fiscus* and included many renovations to alter the functions of some areas used for both residential and industrial activities.

Spatial analysis provides evidence for the function of areas over time, which can be seen by identifying recurrent patterns in the distribution of archaeological remains (Allison 1999:5). For example, areas used for cooking may show charred cooking pots, burning patterns and charcoal on surfaces near the fire. Looking at spatial distribution can help to gain a better idea of the range and distribution of activities, behaviour and ideologies of the Roman household (Allison 1999:6). It must be remembered that the use of space changes over the course of the day and will be reflected in the artifacts

found at sites (Allison 1999:12). Rooms in the villa could be used for multiple activities throughout the typical Roman day. In the households at Pompeii, a variety of domestic utensils were found in the relative location in which they were abandoned when the occupants fled the city upon the violent volcanic explosion of 79 CE (Allison 1999:58-60). The households provide a snapshot of Roman life, rather than a building that was abandoned and later scavenged for materials. The surviving remains of the Villa Regina at Boscoreale in Southern Italy is a good example of a functioning *villa rustica*, and has evidence of living quarters, wine and olive oil pressing, storage, livestock, cooking, and bread baking (Bergmann 2012:240). Archaeologists have determined which species of plants grew in Roman villa gardens, and today it has been reconstructed and has the same vines and fruit trees as it would have had in antiquity (Bergmann 2012:241).

Villas generated the food and goods used and traded in urban centers.

Agriculture was a very important part of the Roman economy and the majority of the population was involved (Kehoe 2007:1). Villa estates were used by the upper-class citizens of Rome (social and political elite) who derived their fortunes from the revenue they generated from small-scale tenants (Kehoe 2007:1). Large landowners could invest in estates they owned, but would only be profitable if it increased production and benefited them; therefore, the state had property laws that protected not only the landowner; but also the tenant lease holder (Kehoe 2007:2). Both the tenant and landlord could violate a lease contract in Roman law, but the penalty would be a monetary compensation to the other party for losses (Kehoe 2007:69). Roman contract laws prevented the exploitation of tenants by landlords, protected the rights of both

parties, and prevented the landlord from exploiting all the surplus generated by the tenant (Kehoe 2007:72). While the focus of villas was generally agriculture, most also exhibited some level of industrial activity, such as iron working or the manufacture of roof tiles (Wacher 2002:527).

The olive press was a very important technological improvement and investment to help decrease production times. It provided the landowner with the means to produce large quantities of oil and only required an intensification of small scale farming by a labour force to provide more raw product (Kehoe 2007:7). The press could have also been used by farmers in the surrounding countryside. The villa at San Felice has evidence for a press which would increase the output of olive oil or wine made. The acquisition of a press indicates a reliable supply of olives or grapes to press that would create a profit to cover the initial cost and generate revenue. The oil could also be used for burning in glass or ceramic lamps.

A sudden decline in the quality of living during the life of a villa may indicate a change in fortune or status of the owner, possibly causing the villa to be sold or taken away (Wacher 2002:541), similar to the change at San Felice between Phases 1 and 2 (the pre- and post-imperial occupation phases). During construction and renovation of Roman buildings, the functions of many rooms stay mostly the same as the original builders of an earlier period (Allison 1999:4). The layout at San Felice changed little between Phase 1 and 2, but changed quite drastically during Phase 3 (mid-imperial occupation) showing evidence of a shift in focus of the activities taking place there.

The Roman villa evolved into a relationship between the villa and the village (creating the *vicus*), where the villa would house the tenant landlord who would employ the people in the *vicus* (doctors, fullers, smiths, artisans, labourers, farmers) on a yearly contract for their services (Small 2011:25). This was cheaper than if the landlord maintained his own staff permanently at the villa and reduced risk because he was guaranteed the annual rent regardless of weather, market prices, or pests. Towns and villas were interdependent. In the countryside, the land surrounding the villa provided employment, revenue, and leases, while the villa itself served as an economic trade centre for the surrounding area (Wacher 2002: 538-40).

Imperial Estates

The emperor owned imperial estates located all over the Roman Empire including Egypt, North Africa, Asia Minor, and Gaul (Kehoe 2007:55). The emperor was like any other landholder who derived profits from the rent or tax on what his properties produced (Wacher 2002:560). The profits made returned to the imperial treasury (or *fiscus*; “bank account”) that enforced a land-tenure system which provided crops for food and revenue from rent (Kehoe 2007:56-64), based on a tiered social class system.

Around 80 BCE the Italian peninsula was united. All Italians gained Roman citizenship by the end of the Republican period, making them exempt from direct taxation based on land and the size of the workforce, until the end of the 3rd century CE

(Goodman 1997:100-1, 190). Revenue from southern Italy was generated by rent from leases and taxing trade goods (Goodman 1997:190).

The population of the Roman Empire had greatly increased during the early imperial period (1st century CE), growing to around 55-65 million (Kehoe 2007:5). The high mortality rate in urban centers increased the demand for products from the countryside. During this period the villa at San Felice underwent renovations, perhaps indicating an increase in surplus generated for trade.

Imperial estates had their rent collected by middlemen, called *conductores* (Kehoe 2007:67). These *conductores* leased imperial property for periods of 5-years and only made a profit by getting the full share of the rent from the farmers, who had knowledge of crops and the farmland they worked (Kehoe 2007:67). The *conductores* had the right to use the tenants and their draft animals to provide labour for their private plot (Kehoe 2007:67). The *fiscus* offered an incentive to the farmers who invested in the planting of olives, offering rent-free seasons, encouraging long term commitment to the land (Kehoe 2007:65). Many *conductores* would resort to whatever means necessary to extract the most they could from the tenants, including violence and bribing officials (Kehoe 2007:71).

Villas could be occupied by an official who was in charge of collecting rents from the tenant farmers who worked small plots of land associated with the estate (Wacher 2002:562). Sometimes the occupant was a *vilicus* (overseer) that managed a slave labour force in place of the wealthy leaseholder (who usually lived in an urban centre), and who

was sometimes a slave himself (Kehoe 2007: 1-2). The cultivation of olive trees or vines was costly and a huge investment by the tenant; if they forfeited on the lease they would lose a great deal (Kehoe 2007:71). Olives are an intensive-care crop that require time and effort to cultivate; they need significant amounts of labour but not much skilled labour (Kehoe 2007:65). If slave labour was used on estates, then it required sufficient supervision, but when tenants cultivate the land they have incentive to work hard and generate a profit from their investment (Kehoe 2007:65). If the villa at San Felice had olive cultivation it needed to have a workforce, supplied by the Vagnari *vicus*.

SAN FELICE

San Felice became a large imperial estate that had access to resources and trade. Investigating the phases of occupation in detail allows for a look at changes in the use of glass at the villa over time. The extent of renovations in many areas shows that the villa was heavily invested in, and physical evidence shows that the villa became part of the imperial *fiscus* during Phase 2.

The Villa at San Felice

The Roman villa at San Felice is located in Southern Italy, in the modern province of Puglia (see Figure 1 below). To the Romans, the villa was located in the Augustan

regions of Apulia or Lucania, depending on the historical period. San Felice was occupied from the 1st century BCE until the mid-2nd century CE in three phases of occupation and renovation (McCallum et al. 2011:36). The villa at San Felice shows evidence of abandonment sometime after 150/160 CE in favor of smaller settlements.

The villa was approximately one kilometer away from the presumed course of the Via Appia (McCallum et al. 2011:27). The road would have provided the inhabitants of the villa and the neighboring Vagnari *vicus* with a link to trade opportunities with nearby villas, villages, and towns; and made the villa more accessible to outsiders. San Felice had ties with nearby towns such as Venosa, Bantia, and Canusium (McCallum et al. 2011:170). The San Felice villa was constructed on a natural terrace and had a great view of the valley below. It was built adjacent to a fresh water spring (McCallum and vanderLeest 2014:168), an important consideration for the siting of a villa (Marzano 2007:155).



Figure 1: Map of southern Italy with San Felice marked with a tag.

During the 1st century CE the villa became part of the imperial *fiscus*, a property owned by the emperor that was leased or controlled by a tenant landlord. Following the transfer of ownership to the emperor, the villa underwent renovations to the peristyle (open courtyard) and surrounding rooms to provide more space for industry or agricultural processing; while the residential area remained mostly unchanged (McCallum and vanderLeest 2014:171). It is unknown if the villa had a second story; any

evidence has been removed by post-depositional events (washed away by landslide, or torn away by plow).

At Vagnari, there is evidence of iron working and tile making, and the surrounding forests, called *macchia* (a scrub woodland), would have provided ample wood for fires and buildings, which also cleared the land for pastures and agriculture (Small 2011:22). The villa's occupants also engaged in cereal agriculture, oleoculture (olives), and viticulture (grapes for wine) (McCallum et al. 2011:28). Small (2011) estimates that the villa at San Felice and the Vagnari *vicus* were part of an estate around 25 square kilometers (22).

A stamped tile fragment found at the villa in a layer of a roof collapse indicates that Phase 1 of the villa was roofed with tiles produced in a kiln owned by a private individual (Small 2011:23). During Phase 2 of occupation, the villa was roofed with tiles stamped with text indicating that they were manufactured on an imperial property. Among the other finds recovered at the villa were three stone Roman weights used for trading (two 20 and one 30 pound) (McCallum and vanderLeest 2014:170). These weights were recovered from contexts dated to Phases 2 and 3, implying that the villa was perhaps home to an economic middleman who conducted business out of his home (McCallum et al. 2011:170). The weights were likely used to collect rents from tenants (McCallum and vanderLeest 2014:7).

Evidence for local trade comes from the pottery found at the villa. The majority of painted finewares (the vessels are thin, decorated, and often used as tableware) and

were connected to production within the Basentello valley or the neighbouring Vagnari village (McCallum and vanderLeest 2014:7). Examples of Italian *Terra Sigillata* (Italian red-slipped pottery), a Tuscan-style of tableware, were found at San Felice with stamps that can be matched to production at nearby Venosa around the 1st century CE, as well as cookware (pots) that have inclusions in the clay that link them to local clay sources (McCallum and vanderLeest 2014:7). Evidence for more widespread trade has also been identified at San Felice. Ceramic cookware, dating to Phase 2 and 3 occupation, has been identified as originating in modern Albania (McCallum and vanderLeest 2014:7). For a map of the excavated sections of the villa see Appendix B.

Phase 1

Phase 1 of the villa dates to the Republican period, ranging from the mid-1st century BCE to the early 1st century CE at the latest (McCallum et al. 2011:36). San Felice was constructed as a peristyle-type villa but few datable artifacts were found to help interpret the functions of rooms and spaces (McCallum et al. 2011:53). The villa had 18 rooms during Phase 1 and not all have been fully excavated. The villa showed evidence of only a few wall collapses due to landslides and deep ploughing. Renovations at the *vicus* or the nearby Late Antique village, dating to around 4th-6th century CE, used materials that were scavenged from the villa (McCallum et al. 2011:43).

The main function of the peristyle was likely water collection (McCallum et al. 2011:38). The space had a basin that was fed using different methods: a *compluvium* (sloped roof) that would channel rain water down into the *impluvium* (a shallow pool) inside the peristyle; or from a natural spring using a small channel in the southeast corner of the peristyle; or both (McCallum et al. 2011:39-40). The pool drained through a pipe channeling the flow north, to the edge of the terrace on which the villa was constructed (McCallum et al. 2011:39). The drain was constructed using waterproof concrete (*opus signinum*) (McCallum et al. 2011:39). Drains like this one are common to Hellenistic period villas in southern Italy (McCallum et al. 2011:39). The pool was surrounded by approximately ten columns based on the column drums found surrounding the pool during excavations, two being recovered *in situ* (McCallum et al. 2011:38). Some of the columns were built on flat, well-constructed stone bases, placed at every corner and 2.0 meters apart (McCallum et al. 2011:38). The peristyle was surrounded by a portico (a covered hallway) with a beaten earth floor set with river cobbles (McCallum et al. 2011:41). The rooms north of the peristyle may have had a screw press used in pressing cloth because of its dimensions and access to the peristyle drainage channel (McCallum et al. 2011:51).

The western range of rooms was constructed during Phase 1 and remains relatively consistent during later renovations based on the fact that the floor level was not raised by construction and most of the walls remain standing (McCallum et al. 2011:42). Many of the western rooms have shallow foundations and are constructed on the conglomerate substrate (McCallum et al. 2011:37). There is a difference in the

method of construction between the peristyle section of the building and the western range of rooms (McCallum et al. 2011:42). The foundations were constructed using a dry masonry technique (not using lime mortar to hold the stones together), with roughly-hewn stones held together by clay at the centre of the wall (McCallum et al. 2011:42). Many of the rooms do not have any evidence to help discern their function during Phase 1. The rooms connect to a colonnaded hallway along the far western side of the villa, set on the edge of the terrace (McCallum et al. 2011:44). The entire hall has yet to be excavated but an open hallway would have offered an impressive view of the Basentello River Valley, suggesting an area used for reception and residence (McCallum et al. 2011:50). One room was possibly a *triclinium* (dining room with three couches) and would have had a sweeping view of the valley and *vicus* below (McCallum et al. 2011:46).

The western series of rooms were linked via small doorways, some of the rooms had both painted plaster walls and floors (McCallum et al. 2011:44). The colours used were mainly red but also included yellow, orange, blue and black (McCallum et al. 2011:44). The plaster fragments are not datable, but the wall they were adhered to can be dated to Phase 1 (McCallum et al. 2011:45). The presence of decoration in these rooms indicates that the rooms were important enough to put time and effort into having them painted, pointing to a residential or reception space. In the southernmost residential room there was evidence of a stone step leading to the central and eastern rooms in the villa, leading into the peristyle and industrial area (McCallum et al.

2011:49). This is presumed to be the westernmost entrance at the center of the villa, with an excavated northern range of 20 meters (McCallum et al. 2011:49).

Many of the later phases of renovation were placed on top of the Phase 1 foundations, which disturbed the context and made dating difficult (McCallum et al. 2011:37). In general, the majority of the glass finds recovered at San Felice can be associated with Phases 2 and 3, which may show an increase in the popularity of glass, glass recycling, or better access to trade.

Phase 2

Phase 2 dates from the early 1st century CE to late 1st century CE and is marked by the substantial renovations to the villa (McCallum et al. 2011:36, 54). Renovations focused on the peristyle and floor surfaces in the villa.

The floor level surrounding the peristyle was raised 0.2 meters and new walls were constructed (McCallum et al. 2011:54). The peristyle was divided with a small, dry masonry wall (0.45 meters tall) with patches of red paint preserved in situ with waterproof plaster (McCallum et al. 2011:55). This could be evidence of the peristyle functioning as a large basin or pool, and is associated with textile production (McCallum et al. 2011:55).

The hallway surrounding the peristyle received a plaster floor surface during Phase 2 (McCallum et al. 2011:46). A hearth feature was found on top of the plaster

floor and Carbon-14 testing was done on samples taken that have dated it to Phase 2; they also revealed the presence of charred seeds, possibly indicating food preparation (McCallum et al. 2011:57). The new, raised plaster surface was continued into the rooms north of the peristyle, making it easier to walk from the peristyle hallway into the rooms (McCallum et al. 2011:57).

The most significant renovations were to the northwestern most rooms in the residential section where three rooms were combined by knocking the walls down into a room of 4.8m N-S x 6.15m E-W (McCallum et al. 2011:58). A concrete floor surface was laid down in the room and continued through the doorway into the room just to the south (McCallum et al. 2011:58). Evidence shows the room also received a raised platform (1.45m x 2.6m) made of waterproof concrete, perhaps used to elevate tools or furniture (McCallum et al. 2011:58). The room was large enough to be a reception room, or it could have functioned as a work space (McCallum et al. 2011:58). The other rooms in the western section were also outfitted with new concrete surfaces made of *opus signinum* (a waterproof concrete) that were smooth and level (McCallum et al. 2011:58). The southwestern most room continued to show evidence of being painted with blue, black and red (McCallum et al. 2011:59).

It is unlikely that the western range of rooms was converted into agricultural areas because of the remnants of painted plaster found, which means they likely continued to function as a residential space (McCallum et al. 2011:59). Phase 2 shows an occupant or owner that had enough wealth to construct concrete floor surfaces

throughout most of the villa, likely making it a suitable place to host business or social activities. However, Phase 3 shows a major change in the focus of the villa's activities.

Phase 3

Phase 3 renovations show a focus on the peristyle and surrounding rooms, dating from the late 1st century CE to the mid-2nd century CE at the latest (McCallum et al. 2011:59). The renovations suggest that the western range may have continued to be largely residential, while the rest of the villa became more focused on agriculture or pastoralism (McCallum et al. 2011:59).

The peristyle ceased to be used for water collection and drainage based on evidence that the pool was filled in with a mix of sediment and refuse (about 0.65 meters deep) (McCallum et al. 2011:59). The midden itself produced datable pottery, charcoal, animal bones (both worked and unworked), loom weights, and glass (McCallum et al. 2011:60-1). The midden was in use between the mid-1st to early 2nd century CE and is indicative of activities in the peristyle late in Phase 2 (McCallum et al. 2011:61). Animal bones show cut marks indicating that animals were being butchered near the peristyle, a significant proportion of which were wild animals and cattle, for meat consumption in or near the villa (McCallum et al. 2011:61-2). The pottery inside the midden shows a majority of cookware, some tableware, and bread-baking pots (McCallum et al. 2011:62). The fragments were heavily sooted, indicating heavy use and

that they were discarded at the end of their use life (McCallum et al. 2011:62). The evidence suggests that the space in and around the peristyle functioned as a food preparation and consumption area (McCallum et al. 2011:62). This midden was sealed by a wall collapse at the end of Phase 3; consisting of limestone, bricks, columns and tiles (one stamped) (McCallum et al. 2011:60).

During Phase 3, walls were constructed over the midden and basin area (preserved to ca. 0.4 meters in height) to divide the area up and its new function is unknown (McCallum et al. 2011:60). The corridor around the peristyle was also divided up into smaller rooms with dry masonry walls, similar to the new wall built inside the peristyle (McCallum et al. 2011:62). At least 2 of the rooms surrounding the peristyle received a new beaten earth floor (different from the beaten floor used in Phase 1), made of brownish-yellow clay with no river cobbles (McCallum et al. 2011:62). The small rooms created in the peristyle area may have been used for storage, or animal pens for pastoral activities such as milking, shearing wool, and possibly butchering (McCallum et al. 2011:63).

The renovations to the western range of rooms is minimal, but one room (that had painted wall plaster during Phase 2) had a small platform constructed in the southeast corner, which might have been used as a small press or a shrine (McCallum et al. 2011:63). The Phase 3 room had a beaten earth floor, and a layer of ash was found near the platform, on top of wall plaster fragments similar in composition to the Phase 1 plaster (McCallum et al. 2011:63-4). Since the ash layer was found on top of the plaster

collapse, it likely dates to the after the Phase 3 occupation and indicates that the Phase 3 room had painted walls since Phase 1 (McCallum et al. 2011:64).

The bulk of the glass in the database has been dated to Phase 3 at the villa, and by the 2nd century CE glass had become widely used and easily accessible in the Roman world. Looking at the contexts in which the glass fragments were found may help to better understand some of the activities at the villa.

Industry at the Villa

One of the household activities at the San Felice villa was textile production, which can be identified by the related items recovered. These items include loom weights, a carding ring (used for brushing wool for spinning), spindles, bone distaff, and spindle whorls (McCallum and vanderLeest 2014:6). In total, the number of loom weights recovered could have come from one or two vertical loom weights. It is common to find loom weights in Roman homes (Allison 1999:70). 72% of the evidence for textile production at San Felice comes from a midden inside the villa dated to Phase 2, when the peristyle water feature was still in use. This space was used during production for cleaning wool in the spring-fed water supply (McCallum and vanderLeest 2014:6). All Roman households produced textiles for internal consumption (Marzano 2007:121).

McCallum speculates that the villa could be producing a surplus of processed wool destined for trade (2014:6). Other evidence to support a textile trade at San Felice

is the palaeobotanical data gathered from the site during excavation. Seeds from soapwort (*saponaria officinalis*) were used to clean wool in Europe for millennia (McCallum and vanderLeest 2014:6). If the textiles at San Felice were produced using Apulian (southern Italian) wools, they may have been quite valuable and desired throughout the empire, possibly exporting to markets such as Rome (McCallum and vanderLeest 2014:7).

Evidence of meat processing at the villa has also been found. The faunal (animal) data help to give a better picture of the diet of the villa's occupants. An animal bone specialist, Michael MacKinnon, has examined and identified 6000 bone fragments recovered from the site during its excavation activities (McCallum and vanderLeest 2014:6). There are a minimum of 1600 identifiable animal bones represented in the assemblage (group), including those of deer, boar, cattle, sheep, and goats (McCallum and vanderLeest 2014:6). The bones show evidence of commercial butchery. The occupants of the villa had a more varied diet than those of Vagnari.

The surrounding forests were also utilized for resources by the occupants of the villa. Robyn Veal, a charcoal specialist, has been working with the pieces of charcoal recovered at the site during excavations. The species of wood burned at the villa has been linked to the scrub woodland surrounding the villa (McCallum and vanderLeest 2014:169). The villa does not show evidence of burning wood specifically to produce large quantities of charcoal that was commonly used as a smokeless fuel source, superior to raw wood (McCallum and vanderLeest 2014:170). It is likely that olive oil produced at the villa was burned in favor of wood.

The basin room in the villa of San Felice was perhaps used for olive oil or wine production using a press, but there is little evidence remaining other than the four basins. Surveys and excavations of other villa sites in Italy show that they were also equipped with presses, and that the ratio of production areas to territory was one press every two kilometres in central Italy (Marzano 2007:103). It is likely that these types of facilities were used for the production of both oil and wine because the harvest times of grapes and olives do not coincide (grapes in August-September; olives December-February) (Marzano 2007:106). One problem is that olive oil processing requires a settling basin to separate the oil from the *amurca* (a sediment), which means that the vat would have to be cleaned between uses (Marzano 2007:106). One room north of the basins may have functioned as a storage room; the bases of large ceramic *dolia* used as storage jugs were found partly buried in the floor, one with an animal's paw prints fired into the clay.

Vagnari

The overview of the villa at San Felice, Vagnari, and southern Italy shows context for the factors that might influence the use, access or importance of glass in daily life. Looking at the history of Roman glass, glass-making, and glass-working also helps to provide context for how easy glass is to make and access.

The villa at San Felice overlooks a small collection of buildings, called Vagnari, and its cemetery. The distance between them is around one kilometer (McCallum et al. 2011:27). San Felice and the Vagnari *vicus* would have had close economic ties to each other, and were part of the encompassing imperial estate. Stamped clay tiles found at Vagnari have been traced by Neutron Activation Analysis to a clay pit at the edge of the ravine at the south-east side of the site, which points to local production of tiles (Small 2011:21). This evidence suggests strongly that by the 1st century BCE the estate was acquired by the emperor (Small 2011:21).

Some of the land surrounding Vagnari and San Felice was likely used for forest and rough grazing, and is known as a *saltus* (Small 2011:13, 24). The wood provided by the forests would be used for firewood for kilns, construction lumber, and charcoal for burning and soap making (Small 2011:13). The forests also would have provided pannage (letting them roam free to forage for food) for pigs, and other domestic animals such as sheep, goats and cattle if the lower branches were cut away to allow easier roaming (Small 2011:13). The forest was also home to wild animals, like red and Roe deer (Small 2011:13).

Vagnari showed evidence of pig-raising, cereal agriculture, its own mill, iron-working facilities, wood collection, kilns for ceramic tile making (Small 2011:27), and recently, glassmaking (McCallum and vanderLeest 2014:169). Both iron and glass slag (glass production waste) has been found, along with fragments of bronze, iron, and lead, which all showed signs of being destined for recycling (Carroll 2012:6).

Excavations conducted by Carroll at Vagnari during 2012-2013 have concentrated on a section of the *vicus* that was identified by a resistivity survey conducted over the site (Carroll 2012:4). The area chosen for excavation is believed to have been slave quarters, and appears as a long rectangular building with smaller rooms of similar size within it (Carroll 2012:3). Evidence of slaves at Vagnari comes from the same tiles used to date the imperial sites, tiles stamped with '[possession] of Gratus, [possession] of Caesar' (Small 2011:21). Excavations were unable to confirm whether the rooms were slave quarters, free labour quarters, or storage areas for production materials (Carroll 2012:5).

Among the small finds recovered were pottery and coins that date the activity at the site to the 1st to the 4th century CE (Carroll 2012:6). The site also had its own cemetery, where over 110 burials were excavated by Prowse (most dateable to the 1nd - 3rd century CE) (Prowse 2012:378-379).

Different styles of burials have been found in among the cemetery at Vagnari, and many grave goods have survived to show researchers what goods they chose to include in the grave for use in the afterlife, but many of the graves in the cemetery date to the occupation after the imperial occupation at the San Felice villa. The presence of glass vessels shows that glass was important enough in daily life to be placed in the graves of the lower social classes. Glass vessels would have been important in both the *vicus* and villa, as a symbol of status or because of their function.

The skeletons of the cemetery are being used to study the people who worked and lived in the *vicus* below the villa. A selection of skeletons was subject to stable isotope analysis, and others, to mitochondrial DNA analysis (Prowse et al. 2010:175). The results showed skeletons with Western Eurasian, East Asian, and African descent (Prowse et al. 2010:187). This shows that the *vicus* and villa likely had a group of migrants or possibly slaves in the workforce (and residential population). If her sample is representative, than possibly 1 in 5 persons were not born and raised locally.

The foundations and material found at Vagnari show evidence that it was too large to be a single farm house, and was perhaps a cluster of three or four farm houses and other ancillary buildings (Small 2011:13). Rural sites like Vagnari were numerous, and field survey in the surrounding Basentello valley has identified over 62 sites (Small 2011:14).

The hilltop settlement at Botromagno was known as *Silvium* to both the Hellenistic (circa 300 BCE) Greeks and the Romans (Small 2011:15). The name makes an appearance in Livy's later accounts of the 306 BCE garrison of the town Samnites and eventual sack by the Roman army who carried away 5,000 captives and other loot during the 2nd Samnite War (Small 2011:16). At the end of wars and battles it was Roman policy to expropriate land to become public land of the Roman people and parceled out (Small 2011:17) The pottery evidence from sites in southern Italy shows that population declined in the 3rd century BCE likely associated with the Punic Wars (Small 2011:16).

During the second half of the 2nd century BCE the Via Appia was extended from Venosa to Tarentum (Small 2011:17). The extension of the major roadway passes very close to the sites of Vagnari and San Felice. Major roads were important for being able to reach one's property allowing for construction, shipment, and distribution of commercial goods produced on the estate (Marzano 2007:154).

CHAPTER III: A HISTORY OF GLASS IN THE ROMAN WORLD

Glass was becoming increasingly popular during the lifetime of the villa and was used in favour of pottery. The Roman glass industry underwent significant changes during the early occupation of the villa, including the introduction of the blowpipe which made glass vessels easy to mass produce. The purpose of the following chapter is to provide background information on the development of glass technology and the uses of glass vessels in the early imperial period to better contextualize the analysis of the glass assemblage from the villa at San Felice.

Roman Glass

Glass has had a long history with many cultures around the Mediterranean Sea (Egypt, Syria, Greece and Italy). The ancient Egyptians used glass for mosaics and jewellery for many centuries before the Romans created their empire. Egyptian and Greek artwork was emulated by the Romans, and items could be bought through trade during the 1st century BCE. Glass vessels were first produced by carving the vessel out of a solid block of glass, or by pouring molten glass into a mould. By the second half of the first century BCE, it is believed that the blowpipe technique made its way from Syria-Palestine into Italy (von Saldern 1966:7; Arletti et al. 2008:608). The introduction of the blowpipe greatly reduced production time, which in turn decreased the cost of glass vessels and they became common household items. Because of the quickly changing

vessel styles and forms, some types have been noted to have short life spans in the archaeological record and can be dated quite accurately (Silvestri et al. 2008:332). It can be assumed that glass containers were re-used within the Roman household much like today, perhaps for long periods of time before breaking.

We know little about the organization of glass production in the Roman world. Some glass vessels have a maker's signature stamp, usually on the base much like ceramic items. No Greek or Roman glass worker has been named by ancient sources, and many artisans can only be identified by tombstones displaying names and occupations (Stern 1995a:69). About 130 Roman glassblowers are known, and 5 are known to have specialized in decorated mould-blown tableware (Stern 1995a:69). Stamps on glass present the question of whether the mark signifies the glassmaker, the workshop owner, or the maker of the contents of the container (Stern 1995a:69).

While little is known about the organization of glass production, the composition of Roman glass has been intensively studied. There is no specific chemical compound for glass, and there are innumerable recipes, all of which include different quantities of silica, alkali, and lime (Stern 1995b:23). Silica sources were most commonly sand, but crushed quartz and crushed flint were also used (Stern 1995b:23). The alkali portion usually came from plant ashes (Stern 1995b:23).

Sand is the main ingredient of glass and was easily acquired in the Roman period. Many sources for raw materials were traced from glass fragments to their source by scientific testing and classical sources. Using chemical analysis on the different sand

sources, the naturally occurring levels of lime and alumina oxides can be seen. These impurities (calcite, feldspar, and clay minerals) can be measured in glass and matched to the source of their raw ingredients (Arletti et al. 2008: 616, Silvestri 2007:1497). On the Syrian coast, the River Belus shore has sand deposits that have been noted to have highly valued raw materials spanning many centuries. According to Frank, Pliny the Elder, Tacitus, and Strabo have all mentioned its sand as a raw ingredient in glassmaking in the 1st century CE; other deposits mentioned were the Volturnus River north of Pozzuoli on the Tyrrhenian coast and Naples (1982:72).

Alkali lowers the melting temperature of the flux (mix) but increases the solubility of the glass in water (Stern 1995b:23). Potassium and sodium oxides were commonly used, but potash (potassium oxide) creates a less opaque glass by reducing the naturally occurring iron and copper oxides (Lavoie 1987:153), which are common in Roman sources of sand. Using potash also obtains a superior colour and brilliance, and is more solid and enduring than sodium oxide vessels (Brass, 1999).

Lime acts as a stabilizer and allows glass to harden more quickly during the cooling process (Brass, 1999). It also makes the glass more durable when exposed to liquids (Stern 1995b:23). Lime is believed to have been added accidentally during early glassmaking (Frank 1982:72). It can be found in sea shells, limestone dust, or chalk (Brass, 1999). Pliny the Elder, writing in the first half of the 1st century CE, describes the addition of sea shells to the mixture of glass (now a common source of lime) as a new method indicating that recipes only called for only sand and potassium or sodium oxides previously, possibly around the 1st century BCE (Stern 1995a:23). Almost all glass recipes

dating between 700 BCE to the 17th century list sand or crushed rock dust, and pot-ash only, yet nearly all scientific analysis of the raw materials shows that up to 20% of the mix was lime in most cases (Frank 1982:72).

Other oxides, like lead, are added to the flux (glass mixture) to lower the melting temperature, stabilize the mixture while hardening, or obtain various colours. Cullet (recycled broken glass fragments) can also be added to the mixture to lower the melting temperature (Lavoie 1987:153).

Recycling

Glass recycling in the Roman period has been well studied. During the second half of the 1st century CE the collection and trade of broken glass is noted in ancient sources, which discuss peddlers who would trade sulphur in exchange for broken glass (Silvestri 2007: 1489). It was an important Roman discovery that glass cullet could be reheated and added to a new batch to be re-worked into new vessels (Silvestri 2007:1489). When a batch of glass has a high percentage of cullet the glass can sometimes be stiffer to work with (Stern 1995b:21).

The shipwreck of *Iulia Felix* is an interesting case study for Roman recycling. The ship was found sunk off the Adriatic coast of northern Italy. Within her holds were over 11,000 fragments of vessel glass ranging in shape and colour, destined for a 3rd or 4th century CE Roman recycling centre (Silvestri et al. 2008: 331). Many fragments have the

shape of cups, goblets, plates, bottles, small jars, and other common types of containers. The colours range from the most common Roman pale blue-green, to green and yellow, along with colourless (Silvestri et al. 2008:331). It has been suggested that all the samples of glass found within the shipwreck can be attributed to accidentally broken glass that was collected for the purpose of trade and reuse (Silvestri et al. 2008:331).

Recycling of materials (possibly broken glass fragments) from San Felice may have been conducted at Vagnari or in the villa during the post-occupation phase (McCallum et al. 2011:64). Glass recycling or production could be linked to the lime kiln also found inserted into the villa after it was abandoned.

Patina

When glass decomposes, the surface becomes covered by a dull layer that can flake off easily. This is caused by the material surrounding the fragment that leeches alkali ions out, leaving an alkali-deficient layer on the surface of the glass (Frank 1982:12), known commonly as patina. Factors that contribute to this decomposition are the material surrounding the fragment (soil or water), the total surface area of the glass exposed to the surrounding elements, and the composition of the glass itself (Frank 1982:13). When the patina forms it creates a barrier that helps to prevent decay, but the infusion of the alkali ions in the surrounding material from the glass usually increases the pH level (the measurement of acidity in a solution, higher being more

damaging) which then increases the decomposition of the surface of the glass (Frank 1982:12).

Excavation of glass fragments can be just as harmful as decomposition because a sudden change in pH level can deteriorate the glass quickly, for example if the glass was deposited in a wet or damp climate and became suddenly exposed to sun and air (Frank 1982:91). Care should be taken to stabilize the transition from the environment surrounding the glass to a new one (Frank 1982:91). Water vapor (condensation and high humidity) attack the glass slowly and cause decay, so a stable environment is very important for preserving an artifact after it is removed from the dirt, like climate controlled areas and in certain display cases in museums where long term storage is used. Glass from the San Felice excavation is sorted into labeled perforated plastic baggies that are organized in storage containers and contained in a thick walled, archaeological storeroom in Gravina in Puglia, Italy. The shards are also sent to a conservator. The stable conditions in the storeroom help to halt the decomposition of the fragments and preserve them for future study.

TECHNIQUES

Roman glassmaking techniques varied depending on the intended function of the vessel. Some techniques leave distinct marks on the vessel. Glass window panes were becoming popular during the villa's occupation. Some of the glass fragments found at San Felice show evidence of characteristics obtained using certain production methods. Glass slag found at Vagnari could have come from creating large glass blocks for later reworking.

Glassmaking

Some scholars believe that glassmaking was divided into two industries. The primary workshop was used to create rough moulded glass blocks, cast next to or near a sand source. The secondary workshop was where individual vessels were formed by reheating some or all of the glass block (Degryse and Schneider 2008:1993).

Glassmaking in the primary workshop can be split into two steps. First, a solid-state reaction was needed between the silica and the alkali to release gases that would otherwise become trapped in the molten glass when melted (Stern 1995b:23). The reaction is generated by heating the mix without melting it (Stern 1995b:23). Once cooled, the mix was finely ground and mixed with the other ingredients, such as decolourants or colourants (Stern 1995b:23). Second, the mixture was melted at

approximately 1000-1100°C (Stern 1995b:25). The molten glass was moulded into blocks or ingots to be traded and/or worked into objects and vessels (Stern 1995b:25) at the secondary workshop. The Romans had specialized furnaces for each of the two steps for glass making (Stern 1995b:22). The heat source used for glassmaking is believed to have been a low, domed kiln or furnace (Stern 1995b:22). Important improvements to furnace technology has been noted around the 1st century CE, coinciding with other new glass technological advancements (Stern 1995b:22), and the increase in glass at San Felice.

After the glass mixture was finished it was then formed into objects using both hot and cold methods of reworking (Stern 1995b:25). Hot techniques required the glass to be reheated in a crucible, a ceramic container placed inside the furnace (Stern 1995b:21). The glass working furnaces have been reconstructed from representations on Roman lamp decorations dating to the 1st century CE (Stern 1995b:22). The typical furnace has a tall, truncated conical form with two holes, the lower used to stoke the fire and regulate temperature, while the upper hole was used for working and heating the glass (Stern 1995b:22). Hot glass working techniques include casting, fusing, mould-forming, spinning, blowing, and core-forming (Stern 1995b:25). Cold techniques do not require the block to be reheated and include cutting, drilling, engraving, polishing, and grinding (Stern 1995b:25).

The Blowpipe

The introduction of the blowpipe was revolutionary because it allowed glass vessels to be produced easily. Glass blowing uses less glass per object to make, and new shapes were easy to recreate repeatedly using moulds (Stern 1999:442). Blowing molten glass requires a constant temperature of ca. 1050-1150°C, and failure to maintain the temperature results in impurities in the glass, like bubbles, but consistent heat requires a sufficient amount of fuel (Stern 1999:451).

A blowpipe is a long hollow tube into which the glass worker would blow after gathering a glob of viscous glass on the end to inflate it into a vessel body. The tube would have been long enough for the worker to avoid the direct heat of the fire (Stern 1995a:39). The material of the tube was also an important element for successful glass blowing. Today glassmakers use iron and steel blowpipes. During the 1st century BCE, iron was a common element to the Romans but was difficult to shape into a tube, and it would be a big investment on behalf of the glass maker to buy or construct (Stern 1995a:39). Remains of iron rods and tools for Roman glass working were found all over the Roman Empire, and have been dated to the 3rd- 4th century CE (Stern 1995a:42).

Blowpipes are used to gather a glob of heated glass on their end, allowing a wide range of techniques to shape the glass. The end of the pipe is heated until it glows, then it is rolled in small chips of glass that melt and become an adhesive to the glob (Stern 1995b:40). The glob was then manipulated into its shape by blowing into the pipe, either free form or into a mould. The vessel is then removed from the blowpipe sometimes

leaving distinctive marks. The base and neck of the vessel are then shaped by reheating those parts of the vessel, while being held by a pontil (a solid rod) or by a clamping tool (Stern 1995b:20).

Bubbles are caused by blowing into the hot glob of glass through the blowpipe. They become accidentally trapped during glass working but can be useful for determining the direction of flow and the method of manufacture (Stern 1995b:19). Ancient glass tends to have more bubbles than modern glass, perhaps due to production techniques that did not allow for them to escape (Stern 1995b:19). Clay crucibles are believed to be a factor because of the small quantities of glass being melted at one time (Stern 1995b:21).

Glassworkers often used clay during glass production (moulds and other containers); a ceramic blowpipe would be easy to create (Stern 1995a:40). An inexperienced person could shape a ceramic blowpipe in roughly 10 minutes (Stern 1995b:40). Ceramic pipes need lower temperatures during firing and glass working to keep some elasticity in the clay, and to absorb heat and prevent breaking (Stern 1995a:40). Glass working at Vagnari could have used a clay blow pipe, although evidence for iron working also provides the capability of producing iron blowpipes. Ceramic blowpipes would only be able to hold a limited weight. Glass blowpipes could have been used, but glass would be weak and only able to hold the weight of small vessels.

The shape of glass vessel was influenced by pottery vessels used for the same activity. For example amphora, a two-handled storage and transport container used to

hold liquids with a narrow mouth, allowing it to be closed off to the air (Stern 1995b:31). Jars and jugs were also common, jars were wide mouthed with a lid and no handle, while a jug usually had one handle for pouring (Stern 1995b:31). Vessels used for common household activities for drinking and eating were cups, goblets, bowls, plates, pitchers, flasks (with a wide mouth not meant for a stopper) and beakers (Stern 1995b:31). Containers for perfumes and cosmetics sometimes had long necks to prevent the liquid from evaporating, some requiring a rod to dip into the container, while others were short and bulbous (Stern 1995b:31).

Moulded Glass

Moulds were widely used by the Romans to shape glass vessels before the blowpipe was introduced. A mould was created using clay or wax and a model, and it could be used repeatedly until damaged, or perhaps until the vessel went out of style. Moulds were used when creating multiple uniform bottles shaped like human heads, animals, or fruit. Any vessel features were added after by hand; this included the rim, foot, or handles (Richter 1911:14). Hollow rims are formed by rolling the edge down, leaving tool marks on the vessel where the edge is fastened to the neck, and where the pontil was attached to the bottom of the bottle while reheating the vessel neck (Cool and Price 1997:150, Stern 1995a:45).

After the arrival of the blowpipe, moulds were still extensively used. Mould blown glass vessels were valued for ensuring uniformity between vessels with respect to shape and size, allowing for easy mass production and packaging for long range travel (Fleming 1996:30). Although they were more uniform, over time the vessels produced from a single mould would vary in surface quality, size, and dimensions (Stern 1995a:48). Even if a new mould was created using a vessel fired from the original mould, the size would still vary because clay shrinks when fired or vessels may warp when reheated to finish rims (Stern 1995a:48).

Window Glass

Three methods of shaping window glass can be identified: casting, the crown process, and the cylinder process (Arletti et al. 2010:252). Casting was the earliest technique for window panes, while blown window glass appeared after the 2nd century CE (Arletti et al. 2010:253). During casting, the panes were created by pouring the molten glass into moulds made from either stone or terracotta. These moulds were sprinkled with sand to keep the glass from sticking; this resulted in the panes having a smooth side and a rough side (Arletti et al. 2010:252). The glass was stretched out onto the mould using tools, usually leaving distinctive marks a well trained eye can spot (Arletti et al. 2010:253). When using the crown or cylinder process, the blowpipe would be used to blow a molten glass bubble and was then rolled into a disk-shaped crown or a cylinder, on a smooth surface. The disc-shaped crown would have been removed and

cut into panes, while the cylinder was blown into a tube and rolled flat to obtain a sheet (Arletti et al. 2010:253). Features created during the glassmaking process can help to distinguish between the cast and blown window glass, including surface appearance, thickness of the pane, shape of the edge, and orientation of the bubbles (Arletti et al. 2010:253). Cylinder glass displays elongated and straight air bubbles, caused when the glass tube is rolled flat (Lavoie 1987:178). Bubbles created during the crown process are curvy in pattern and are caused by centrifugal force when spun into a disk shape (Lavoie 1987:178).

Coloured Glass

Coloured glass was obtained by adding metallic oxides to the glass mixture (Stern 1995b:21). The oxides of copper, iron, cobalt and manganese were used to produce colours in glass. This process was regulated depending on the amount of oxygen introduced into the furnace while firing and reheating (Stern 1995b:21).

The most common colour of Roman glass is the transparent, light blue that is caused by the iron impurities found in the raw sand. The iron and oxygen ratio when firing creates a range of colours that vary from blue to olive, green to amber (Stern 1995b:21). Other colours can be created by the addition of oxides that react with each other depending on the amounts added together, including copper, iron, or cobalt. Manganese, a metallic oxide, can create a reddish colour, varying from purple to reddish

brown, when added in large quantities to the mixture (Stern 1995b:25). High quality vessels can be identified by deep colouring, intricate decorations, and gold-bands (Arletti et al. 2008:608).

Decoloured Glass

Decoloured glass was very popular among the Romans for tableware during the 1st and 2nd centuries CE, only declining in popularity in the late 3rd century CE (Silvestri et al. 2008: 331). It was used to make low quality items like bottles and high quality vessels like plates and cups (Silvestri et al. 2008:332). Pliny the Elder talks about colourless glass in *Natural History* (Book XXXVI) saying, “the highly valued glass is colourless and transparent, as closely as possible resembling rock-crystal”. The same could be assumed of onyx glass vessels that resemble veined marble, popular in the 1st century CE (Richter 1911:14). Pliny the Elder also mentions sources of high-purity sands, specifically the River Volturno, north of Naples in southern Italy for colourless glass (Jackson 2005: 764). Colourless glass can be an indicator of a highly developed skill in the glass making profession, and for which a glassmaker would need knowledge of decolourizing agents and of the raw materials to have the greatest effect possible from the minerals while mixing a batch of glass (Jackson 2005:773).

There are two types of colourless glass: vessels made with high-purity raw sand during production, and mixtures which have a decolourizing oxide added to them

(Silvestri et al. 2008: 338). High-purity sand was valued more than the blue/green tinted sand that had iron impurities; this can be verified by actual Roman price lists.

Diocletian's *Edict on Maximum Prices* lists the prices of glass in the Roman Empire and has been found inscribed on marble panels in Latin and Greek all over the Roman Empire (Whitehouse 2004:189). Diocletian was Emperor of Rome in CE 301 and his price edict was an attempt to establish maximum prices and wages throughout the empire (Whitehouse 2004:189-90). The denarii was minted using either bronze or silver, silver coins could have up to 60 grains of silver per coin (Smith 1853:393), and was low in value to the Romans. Prices are listed per one pound (*libra una*). Alexandrian (Egyptian) glass (*vitri Alexandrini*) cost 24 denarii, while Judaeian greenish glass (*vitri Iudaici s viridis*) cost 13 denarii (Whitehouse 2004:189-90).

Decolourizing oxides were added to mixtures by calcining (heating) them together with the iron-containing raw materials before adding the other ingredients (Jackson 2005: 763). Antimony and manganese were both used during the Roman period, antimony being the stronger additive (Jackson 2005:764). Both oxides are derived from minerals and would have required processing before being added to the glass mixture (Jackson 2005: 764). Using antimony as a decolorizer can be traced to the 1st millennium BCE, until the end of the 1st century BCE (and in Britain until the 2nd century CE, using it together with manganese), while manganese was favored from the 2nd century CE onwards. (Arletti et al. 2008:620).

Decoration

Roman glassmakers decorated their vessels in many ways. The blowpipe allowed for the glass vessels to be manipulated while blowing using specialized tools (Richter 1911:18). Any features of the vessel would also be added after the body was shaped, including handles, rims and surface decorations. Applying thin threads of glass to the surface of a vessel was carried over from the Egyptians, and used during the 1st century CE in Italy (Richter 1911:20). Small beads of hot glass were placed on the surface and drawn out to create patterns, zig-zags, spiral bands, or wavy lines (Richter 1911:20). These designs were created mostly using a different colour glass than the vessel body (Richter 1911:20). Many examples remain today of extremely intricate designs on Roman vessels, and would have required a high level of skill to create.

Painted and gilt glass was also popular. Painted glass often had the decoration lightly incised on the surface before the application of paint (Richter 1911:14). During the 3rd to 5th centuries CE gilt glass was created by applying the gold leaf directly on the surface of the vessel while it was still hot. The design was then incised onto the glass using a sharp instrument, the gold leaf outside of the design was removed, and the vessel was then dipped into colourless liquid glass (Richter 1911:14). The gold leaf was left fixed between the two layers. The application of a coloured glaze could also be applied by dipping the vessel into a liquid glass to various depths.

USES OF ROMAN GLASS

The uses of glass in the Roman household were diverse, ranging from serving dishes to window panes. By researching the common shapes and uses of vessels, it is possible to compare the San Felice fragments to complete vessel examples based on a limited number of features remaining, like decoration or rim diameter.

Tableware/Serving Dishes

Seneca remarks that “fruit appears more beautiful than it is if it is swimming in a glass bowl” in his works titled, *Natural Questions* (2010:152). This image is immortalized in wall paintings from sites like Pompeii where fruit is depicted in glass bowls. Glass pitchers and bottles would hold beverages that could be easily poured into glass cups or goblets. Flat plates would be used to hold food while eating. Tableware was usually made in sets with matching pieces.

Members of Rome’s aristocracy and elites ate meals in a special room of the house called the *triclinium*, while average Romans, slaves, and servants did not. The *triclinium* had three couches that allowed 6 to 9 people to recline while eating a meal (Carcopino 1940:264). Reclining while eating was preferred for physical comfort, but also a mark of sophistication and social distinction (Carcopino 1940:264) which was emulated by people who wanted to appear accepting of Roman culture. The Romans took 3 to 4 meals a day; the only serious meal was considered to be the evening dinner,

or *cena* (Carcopino 1940:263-4). The length of a *cena* was dependent on the circumstances and personal tastes of the host, whether it was an ordinary meal or a banquet (Carcopino 1940:264-5). Glass was favored over ceramics for holding food or liquid because pottery is porous, which makes it more difficult to clean out the residue left behind. When using ceramics to transport goods like olive oil or wine, the inside is coated with mineral oil or pine tar to prevent the taste transferring from the container to the product.

Small Containers

Small glass containers were very popular for holding cosmetics, perfumes, medicine, oils, and lotions. Glass rods have been found by archaeologists that were used to scrape the inside of elongated containers that would possibly contain cosmetics or perfume (Wight 2011: 105). Many have loops at the top and small flat disks at the end to scrape bottles, and they can be decorated on the surface or created by twisting the small glass rod while hot. At least two examples of rods were found at San Felice.

Window Glass

Glass in the Roman period was also used as a building material. Window glass became common during the 1st century CE in the Roman world. This introduction has

been observed in an urban context during excavations of Pompeii, Italy, and can be found in imperial bathhouses, used to prevent drafts while allowing light in. Window glass appears in structures built or restored after the earthquake of 62 CE, just before the eruption of Vesuvius in 79 CE that buried the site completely (Arletti et al. 2010:252). Diocletian's price edict also included raw materials for window glass (*specularis optimi*): best quality 8 denarii, and second quality 6 denarii (Whitehouse 2004:189-190). Roman windows were cast or cut into panes and then inserted into bronze or wood frames to hold them in place (Wight 2011:103).

Other Uses

Glass was used for many things besides vessels including jewelry (rings, bracelets, pendants, cameos), game pieces, mirrors, sewing needles and spindle whorls (Whitehouse 2004:190). Beads are a common commodity during the Roman period. Roman beads were cut from a glass tube and could be mosaic, plain or ribbed; or they could have glass decoration applied to the surface afterward (Richter 1911:23).

In households preserved in Pompeii, an upright wooden cupboard was found in many of the forecourts, and inside were domestic utensils such as ceramic vessels, bronze objects, and glassware (Allison 1999:60). These cupboards were likely used for domestic storage or display within the household (Allison 1999:60). The presence of

glass vessels shows that they were utilized on a daily basis and not just for holding perfume or used as fancy tableware.

The exact use and function of the glass vessels at San Felice cannot be known, but we can use the theory of material culture dynamics and interpretation by reviewing the literature on Roman glass and southern Italy. It is possible to better interpret the glass found and to understand its use and function when there is more context.

CHAPTER IV: THEORY

Material-culture dynamics is important when interpreting an assemblage because there are multiple reasons for an object to be present. Roman glass vessels were likely reused in many cases for many functions, meaning identifying an exact use is not possible unless the remains of its contents survived to be tested. By using material-culture dynamics theory, qualitative and quantitative methods to organize the dataset, historical and archaeological context, and examining where the fragments were found in relation to other types of artifacts during excavation, it is possible to interpret a possible function of glass in the villa at San Felice.

Material Culture

Material-culture dynamics refers to artifacts seen as a medium that we can use to discover the cultural past through inference (Schiffer 1988:469). Archaeologists try to explain the relationships between the artifacts and their users, in all times and places (Schiffer 1988:469). It is important to remember that the interpretation of the finds does not produce an exact explanation of the use and distribution of glass fragments because their presence is subject to the original owner's personal choice, social factors, and the intended function of the vessel.

Archaeology has been described as "a 'fitting' (not a testing) process which is both data and question... [where] subject and object are interrelated," and it can be

achieved by the interpretation and description of material culture (Hodder 1999:66).

Interpretation is complex and relies on choosing certain information based on a criteria and involves a person's own perspectives based on the questions they pose (Hodder 1999:67). "All interpretation involves trying to link sense to data" (Hodder 1999:67), and it is important for archaeologists when looking at artifacts or features from a site.

However, in archaeology there is usually a line drawn between interpretation and description, where description encompasses numbers and labels (soil characteristics, volumes of inclusions or finds), and other scientific measurements (Hodder 1999:69).

Many archaeologists agree that human behaviour is best understood when you go beyond the "casual mechanisms in order to interpret the framework of meanings within which people acted and made sense of the events in the world around them" (Hodder 1999:69-70). Interpretation gives importance to the uncertainty of whether a particular case is indicative of a general pattern, or limited to its context (Hodder 1999:70). In archaeology creativity is a valued trait because to interpret an object or feature new solutions are needed when the evidence presents new or contrasting theories, or when new perspectives or information arise (Hodder 1999:71). What is known about the past is constantly changing with new discoveries and new technologies available to us.

Over an area as vast as the Roman Empire, all people cannot be seen as following the same rules regarding the use of objects. The uniqueness of the individual and the geographic location are important during interpretation (Hodder 1999:72). Objects or art found at a site, or even the style of construction, could be a personal choice of the owner, rather than chosen for factors like functionality or cost. For example, the

inclusion of yellow glass may be due to a personal choice, a dominant social trend, availability, or any combination of factors. Material culture studies focus on physical objects and the meanings that were embedded within them.

Material culture analysis uses artifact classification to separate the class and group levels of organization (South 1977:92). South explains “types are often distinguished from other types by a single attribute, though several attributes may well be used” (1977:92). Today using multiple attributes is most common. Group is the top tier and encompasses many classes (for example kitchen, clothing, activities, or bone) and is used to show broader cultural processes (South 1977:93). The class section breaks the group down further and is based on form or function (of ceramics or glass, for example glassware or tableware) and helps answer questions about origin, trade, or behaviour (South 1977:93). When using this method with glass, the group section separates the vessel glass from the architectural (window) glass; while the classes range between the types of vessels (open or closed mouth vessels) or function (tableware, cosmetic bottles, and storage containers).

Pottery is one of the most common artifacts found on Roman sites. Clay was used for making a variety of vessels for every possible function and use. It is one of the “many materials that can be used to fulfil certain functions ... [while] other materials may be far less apparent in the archaeological record” because of activities such as recycling and rapid deterioration (Orton et al. 1993:29). Vessels are tricky to study because both pottery and glass break up into many small pieces and can be scattered over large areas to be recovered from different contexts (Orton et al. 1993:32). The

degree of the vessel breakage can be used to help interpret the depositional processes involved in site formation (Orton et al. 1993:32). Some of the fragments found at San Felice that likely fit together were found in different contexts within the same locus (all dating to the same phase). Future study could help to show how some layers in the villa are connected.

Function plays an important role in why a vessel is constructed in a certain way. By analysing certain features it is possible to interpret their intended use. Important information includes how sharp the curvature of the body is, the diameter of the rim, or the size and shape of the handle. For instance, if one were to make a storage jar the capacity and stability of the vessel would be important. A jar would need strong walls and handles to hold the container's weight when full, along with a neck capable of being easily sealed shut, but the criteria are different for drinking cups or cooking vessels (Orton et al. 1993:76). By examining the rim and handle fragments found at San Felice and looking at examples of complete vessels it may be possible to identify vessels used for food consumption activities.

There are many beliefs associated with eating and drinking, including cleanliness and status (Orton et al. 1993:227). "Food preparation and consumption, and the myths and rituals that surround it, are one of the central aspects of culture" according to Orton et al. (1993:227). Food and the activities that accompany it are important. Both glass and pottery were important to the Romans during the occupation at San Felice, but while the ceramic finds are abundant and allow for information to be gathered about

their use and functions, the glass finds are mainly small in size and fragmentary (with a few exceptions).

To help understand the function and use of glass at the villa I have selected a small group of finds to look at in depth, consisting of mostly complete or unique pieces (see Appendix A). This is an attempt to identify any features about the complete vessel, such as the production technique, style, intended function, and its relation to the villa. Material-culture dynamics will allow for an explanation about the relationships between the artifacts and their users in the villa at San Felice (Schiffer 1988:469).

CHAPTER V: METHODS

Ceramic vessels were extremely numerous during the Roman period and are widely studied by modern scholars. Today many of the types, origin, and function of vessels have been identified. Glass vessels became increasingly popular during the Roman period and many glass vessels replaced clay, consequently many vessels have the same shape and function in daily life. The production techniques and the use of glass was extremely similar to ceramic vessels, therefore I used a methodology associated with pottery for the analysis of glass at San Felice.

The finds were quantified to better see what ratio of parts were represented in the dataset. To quantify the fragments they were divided up according to their physical characteristics, such as body, handle, rim, or base fragment. The rim is the edge of the mouth (opening), located at the upper part of the vessel. Types of rims include the folded rim, which can be both solid and hollow in the centre; and the ground rim, where the unfinished rim is ground down and polished (Stern 1995b:31). The body is the portion between the rim (and sometimes neck) and the base (Stern 1995b:31). The upper part of an upright vessel is called the shoulder (jugs, bottles), and the lower part (just above the base) is called the bottom (Stern 1995b:31). The base is the underside of the vessel that sits on a surface. Depending on the production techniques used, the base may be flat, convex, or slightly concave (Stern 1995b:31).

Other data collected for assemblages generally include fragment count, weight and the number of vessels represented (Orton et al. 1993:168). Weight can become

skewed depending on the proportion of heavier types, versus lighter ones that can be over-represented in the total weight (Orton et al. 1993:169). However, the varying weights of ceramic types can be used when comparing them to other assemblages (groups of artifacts) because relative weights of different types stay the same (Orton et al. 1993:169). Although glass is generally very light there would also be a similar difference between different types of glass vessels. The level of brokenness or completeness is also an important factor; for example, if one vessel broke into 10 pieces while the second did not break, the first type is therefore over-represented ten to one (Orton et al. 1993:169). This factor makes comparison to other assemblages difficult and unreliable, unless they have a similar degree of completeness (Orton et al. 1993:169). Cemeteries, and sites like Pompeii were preserved quickly, meaning most of the artifacts can be found *in situ* and give a better idea of the relationship between the objects, the inhabitants, and daily life.

Archaeological methods and theories assist when interpreting the glass found at the site. Material culture is important for discovering information about the past because we cannot separate people from their possessions. Objects can make life easier and become embedded with social, religious, or personal meaning. The presence of certain objects can tell archaeologists a lot about a site. What can the distribution of glass fragments over the site tell us about the use of spaces? Inference helps to apply both the history of the site, Roman glass, and the San Felice finds in hopes of answering my research questions, including how glass use changes over time at the villa.

Quantitative and Qualitative Artifact Analysis

The glass fragments were examined using their diagnostic characteristics and features, and their possible role in daily life at the villa. Quantitative methods look at categories such as features, numbers, and measurements; while a qualitative approach looks at the findings and seeks to interpret their presence or context (Isaac 1989:157). The electronic database allowed the dataset to be sorted based on characteristics recorded during quantification. The locus number assigned to every context was used to chart from which space in the villa each fragment was excavated from. Using individual characteristics and context, both quantitative and qualitative analysis, allows a wider look at the use and function of glass within the villa at San Felice.

Estimate of Vessels Represented (EVREP)

The number of vessels represented is difficult to estimate. Depending on the skill of the artist and type of vessel, it can be difficult to tell if the fragments that do not fit together are from the same vessel (Orton et al. 1993:172). It is not possible to simply count the number of vessels represented; it must instead be estimated by other means (Orton et al. 1993:172).

When looking at the presence of glass vessels within the San Felice assemblage I used the same ceramic method as McCallum used to quantify the pottery assemblage,

using the method described by Orton et al. (1993) to find the estimate of vessels represented (hereinafter referred to as EVREP) (172). This method produces a maximum and a minimum number of vessels represented, before averaging the two numbers by 2 to find the EVREP (Orton et al. 1993:172). This is opposed to other methods where the 'minimum number of vessels' present is determined, and where all unidentifiable but similar fragments are lumped together.

An estimated vessel equivalent (hereinafter referred to as EVE) uses a fragment which represents a fraction of the whole vessel (Orton et al. 1993:172). 130 rims and bases in the San Felice glass dataset were tested using an EVE rim chart, showing vessels ranging from 1 to 30cm in diameter (see EVE and EVREP tables).

Electronic Database

All the artifacts found at San Felice were entered into a site database using scans of handwritten forms filled out in the excavation lab. For the purpose of this thesis I created my own electronic database of the glass finds from the scans. This took many hours of data entry to accomplish.

To create my database, I tried a few different programs, like Minitab and Microsoft Access, but Microsoft Excel proved most useful because it is the program I am most familiar with, so it was easiest to work with. I have not created a database of this scale before, and one must be aware of the type of information being entered and how

one may want to use the data prior to data entry. It is also wise to decide how to enter these data (abbreviations or key words used consistently throughout) and be able to retrieve the information one wants at any given time. I chose to include all the types of information contained on the paper forms filled out by students (see Figure 2). These forms record physical characteristics of the glass fragments after they were taken to the laboratory and cleaned. This includes the length, width, thickness and weight of the fragments (if there are multiple fragments in one group they are all weighed separately). The colour and any significant features the fragment may have, such as bubbles or a curved shape, and can be noted in the comments section of the form. The forms also record the date excavated, the context (or locus) the fragment came from, as well as an accession number given to all artifacts from the excavation for easy retrieval later. Some database entries have more than one associated fragment, so there is a column for group number. What part of the vessel or object the fragment came from (rim, body, base, handle) is also included. If the fragment is from a rim or base is superimposed on a semi-circular chart (EVE test) by students to obtain the diameter and the percentage of its completeness. I have added a 'phase' column for which indicates the phase to which the context belongs.

San Felice 2013		Finds Record Form	
A. Category			
1- Pottery	6- Other Building Materials	11- Non-Metal Small Finds	
2- Roof Tile	7- Wall Plaster	<u>(2- Glass)</u>	
3- Flooring	8- Inscriptions	13- Bone & Shell	
4- Worked Stone	9- Coins	14- Charcoal/Other Samples	
5- Architectural Fragments	10- Metal	15- Other	
B. Classification			
Registry Number	<u>940-12-25004-13</u>	Date Processed	<u>23 July 2013</u>
Locus Number	<u>25004</u>	PB Number	<u>6</u>
Subcategory: <u>clear glass, rim</u>		Date Excavated	<u>4 July 2013</u>
C. Description			
Material: <u>glass</u>			Group of <u>1</u> Pieces
Length: <u>1.5cm</u>	Width: <u>0.9-1.1cm</u>	Thickness: <u>>0.1-0.2cm</u>	
Weight: <u>0.2g</u>			
D. Other Records			
Drawing(s) Made:	Yes	No	Date:
Photograph(s) Taken:	Yes	No	Date:
E. Comments & Identification			
<u>clear glass. rim fragment, solid rim. lots of bubbles. Body fragment is extremely thin, less than half of 1mm.</u>			
Registered by <u>Cena Kilback.</u>			

940-12-25004-13

Figure 2: Sample of a San Felice Finds Record Form.

In total, there were 953 entries in the database and these entries represent 2002 fragments altogether, excavated between 2005 and 2013. For the purpose of this thesis, I sorted the fragments into a dataset (a group within a collection of data) and eliminated fragments that did not date to phases I, II, and III. This eliminated all disturbed contexts

(pre- and post-occupation loci, topsoil and subsoil disturbed by plowing). In total, 496 fragments were eliminated from the glass dataset, leaving 1506 fragments linked with Phases 1, 2, and 3 (see Table 2). Entering information into the database took up the majority of my research period but has been worth the time spent.

Phase 1	87
Phase 2	229
Phase 3	1187
Total Fragments	1503

Table 2: Total fragments table.

Due to the small size of many of the fragments and the under-representation of Phase 1, it was difficult to directly identify and interpret vessel types other than through generalization, like open-formed vessel (bowl or plate), closed-form vessel (wine bottle, perfume bottle), or architectural feature (window). The main focus was incorporating the assemblage into the activities taking place in the villa by comparing it to other finds and features, along with any change in the spatial distribution of glass between Phase 1, and Phases 2 and 3.

One problem with the under-representation of Phase 1 is the impact on interpretation it has when comparing use and distribution between phases. Phase 1 has 85 fragments associated with it, while Phase 2 has 232 and Phase 3 has 1189. The greater number of fragments associated with later Phases of occupation at San Felice is linked to the number of deposit layers for each phase. Phase 1 has no fill layers

associated with it, Phase 2 has several layers, and Phase 3 has fill and destruction layers indicative of activities accompanying the collapse and abandonment of the villa.

Spatial Distribution Maps

I have created spatial distribution maps to show the spread of glass fragments over the site (see Appendix B). This was achieved by using a site map of the excavated areas with all important features mapped out. The map shows the foundations of walls and floor surfaces that were exposed by excavation so far, and gives an overview of the way the Roman villa was organized in relation to itself and to the world around it (the plateau and the stream). I superimposed a grid over the distribution maps and added dots of colour to show the general area where each glass fragment was found during excavation. Different colored dots were assigned to each phase and the number of the dots together show an increased number of fragments found in that locus (area of the site); for example one dot represents 1-10 fragments and two dots represents 11-50. The sharp increase in fragments represented is due to the large amount of Phase 3 finds that had to be represented on a small image while leaving room for the other phases. The map was created by applying the dots in layers; this allows the three phases to be shown separate from one another and to facilitate looking at changes in spatial distribution over time.

CHAPTER VI: FINDINGS

The glass dataset at San Felice shows a majority of Phase 3 fragments, dated based on identification of ceramic finds and Carbon-14 testing. Phase 1 materials have been removed during renovation and construction within the villa during the later phases. Phase 2 may also be under-represented because many of the glass vessels were reused within the villa until Phase 3 and perhaps deposited in the peristyle midden during Phase 3 with other household refuse, or collected for recycling in connection with the post-occupation lime kiln found in the villa.

The fragments they were divided into categories according to their physical characteristics to quantify them (such as body, handle, rim, or base fragment). Table 3 shows the dataset divided up into phases and features.

	Body	Handle	Rim	Base	Other	Total
Phase 1	63	1	19	4	0	87
Phase 2	182	1	27	9	10	229
Phase 3	969	10	136	67	5	1187
Total	1214	12	182	80	15	1503

Table 3: Quantification table.

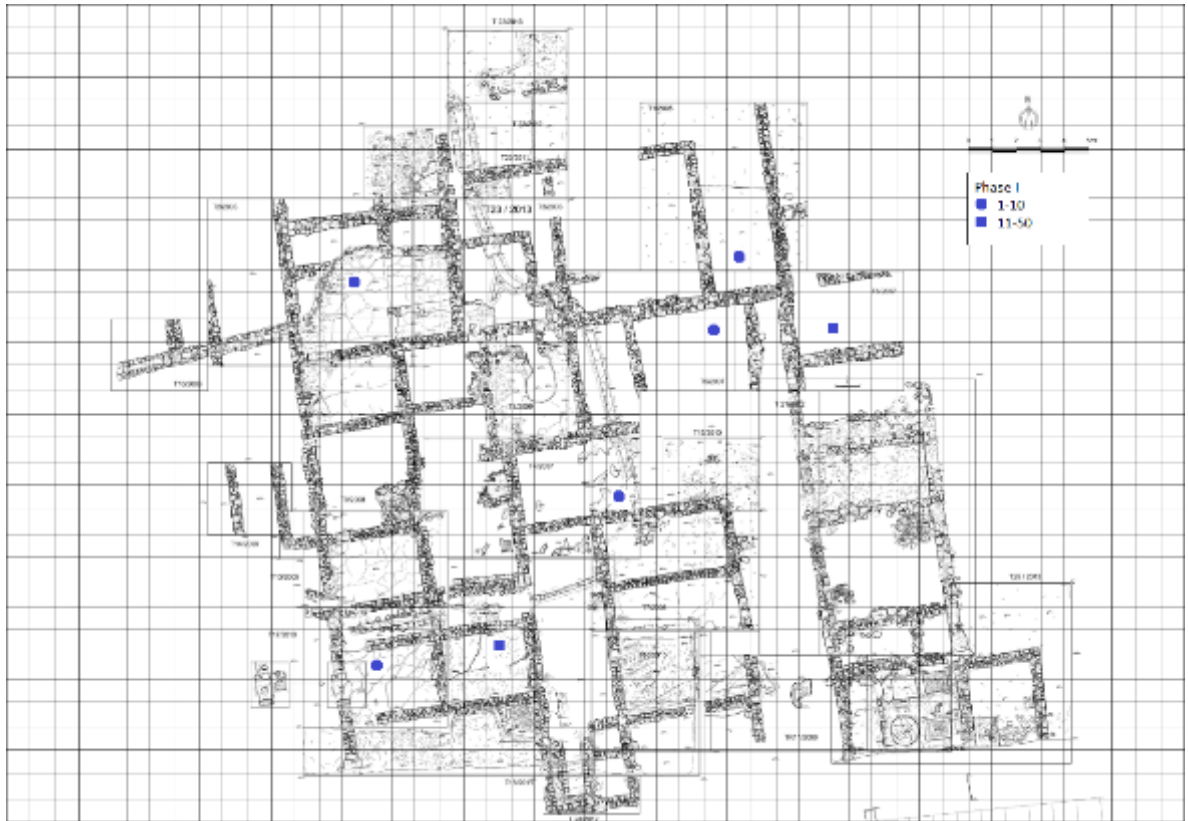
63 of the 87 Phase 1 fragments are from vessel bodies, and 19 are rims. During Phase 1 the villa functioned as a privately owned Republican peristyle-type villa, and occupation dates from the mid-1st century BCE to the early 1st century CE (McCallum et

al. 2011:36). The Phase 1 villa was constructed using dry masonry techniques, and most rooms contain a beaten earth floor set with river cobbles. The peristyle had an *impluvium* to collect rain and spring water for use in the villa. Ceramic vessels were cheap and easy to make, while glassmaking was still in its early stages and the blowpipe technique only became popular near the end of Phase 1. The Via Appia was extended during the 2nd century BCE, so the residents would have had access to outside goods. The dataset shows that Phase 1 had mostly blue fragments associated with it, the natural colour of Roman glass. Green, colourless, yellow and red are the only other colours represented in Phase 1, while there is a larger variety of colours during the later phases (see Table 4).

	Blue	Green	Colourless	Yellow	Amber	Marble	White
P1	62	8	4	10	0	0	0
P2	142	31	23	14	8	1	3
P3	662	219	139	84	45	13	2
Total	867	257	166	108	53	14	5
	Brown	Painted	Red	Purple	N/A		
P1	0	0	2	0	1		
P2	2	0	0	1	4		
P3	3	3	1	1	15		
Total	5	3	3	2	20		

Table 4: Colour table. (N/A= no colour available).

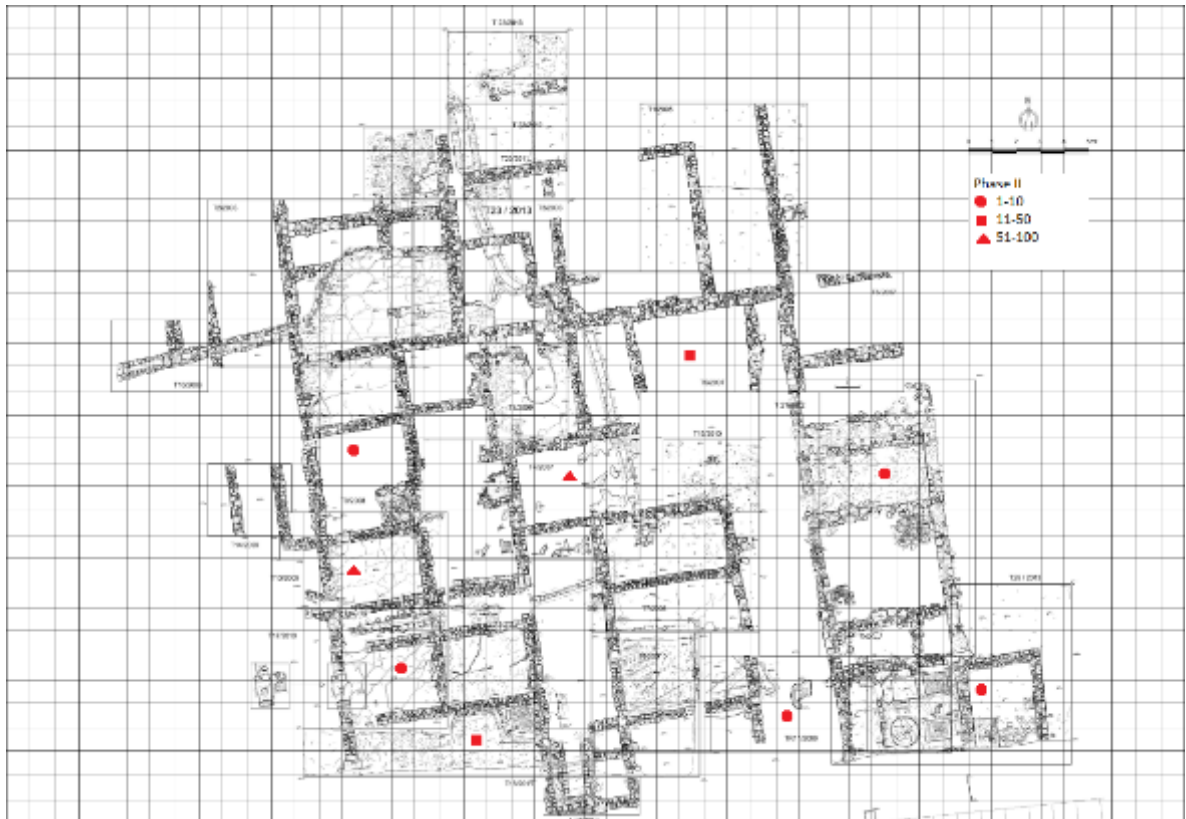
The spatial distribution map (Map 1) shows that glass was used in the rooms at the entryway to the *villa rustica* section, and in rooms surrounding the peristyle.



Map 1: This map shows the scatter of fragments associated to Phase 1.

Phase 2 dates to the early 1st century CE until the late 1st century CE (McCallum et al. 2011:36). The villa became an imperial estate and underwent renovations; many of the rooms received plaster floor surfaces, some painted. Phase 2 has 229 fragments, the majority being body shards. The spatial distribution map (Map 2) shows that there is an increased frequency of glass fragments in the western residential section in the villa since Phase 1. The blowpipe technique was spreading quickly across the Roman Empire during the 1st century CE. The number of fragments is still low compared to Phase 3.

However, and the weights found at the villa implies the trading of goods and business transactions, meaning glass would have been easily accessible and rising in popularity.



Map 2: Phase 2 shows an increase in the density of fragments at the western edge.

Table 5 shows the minimum, maximum, and the estimate of vessels represented (EVREP), for each phase and overall, for the rims in the dataset. When calculating the numbers, only entries with an EVE taken were used (see Table 6). In Phase 1, rims make up 19 of the total 87 fragments, and could represent a minimum of 8 vessels, a maximum of 11, and an EVREP of 9.5 vessels at the villa. During Phase 2, rims make up 27 of the 229 fragments that make up a minimum of 9 vessels, and a maximum of 11,

with an EVREP of 10. Phase 3 has the most rim fragments with 136 of 1187. It has a minimum of 41 and maximum of 64, with an EVREP of 52.2 vessels represented in the dataset. Overall, the dataset shows that there could have been at least 72 individual vessels represented by the rim fragments found at the villa for Phases 1, 2 and 3.

	Minimum	Maximum	EVREP
P1	8	11	9.5
P2	9	11	10
P3	41	64	52.2
Overall	59	85	72

Table 5: EVREP table.

EVE/ DIA (CM)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	+	Total
P1				3		1	1	1						2		1	1	10
P2	1		1	1		2	1		1					1			3	11
P3	2	4	4	3	4	1	1	5	5	3		6	2	1	4	4	15	64

Table 6: Rim diameters of San Felice.

The villa has a major change in focus during Phase 3, with renovations to the peristyle and the adjacent hallway. Phase 3 dates from the late 1st century CE to the mid-2nd century CE (McCallum et al. 2011:36). The large water basin in the centre of the peristyle becomes filled in with trash and household waste, which is typical of abandonment processes, and includes over 700 of the glass fragments associated with Phase 3, but the majority of the material represents Phase 2 activities. The spatial

distribution map (Map 3) of Phase 3 shows that the peristyle and western range of rooms appear to be areas of high activity, although the substantial fill layers (middens deposits) provided most of the fragments. The eastern rooms have no glass in the contexts related to Phase 3, perhaps due to the renovations; the new agricultural or pastoral activities taking place or were collected for recycling at Vagnari or elsewhere.



Map 3: The map for Phase 3 shows glass activity in the house is more represented.

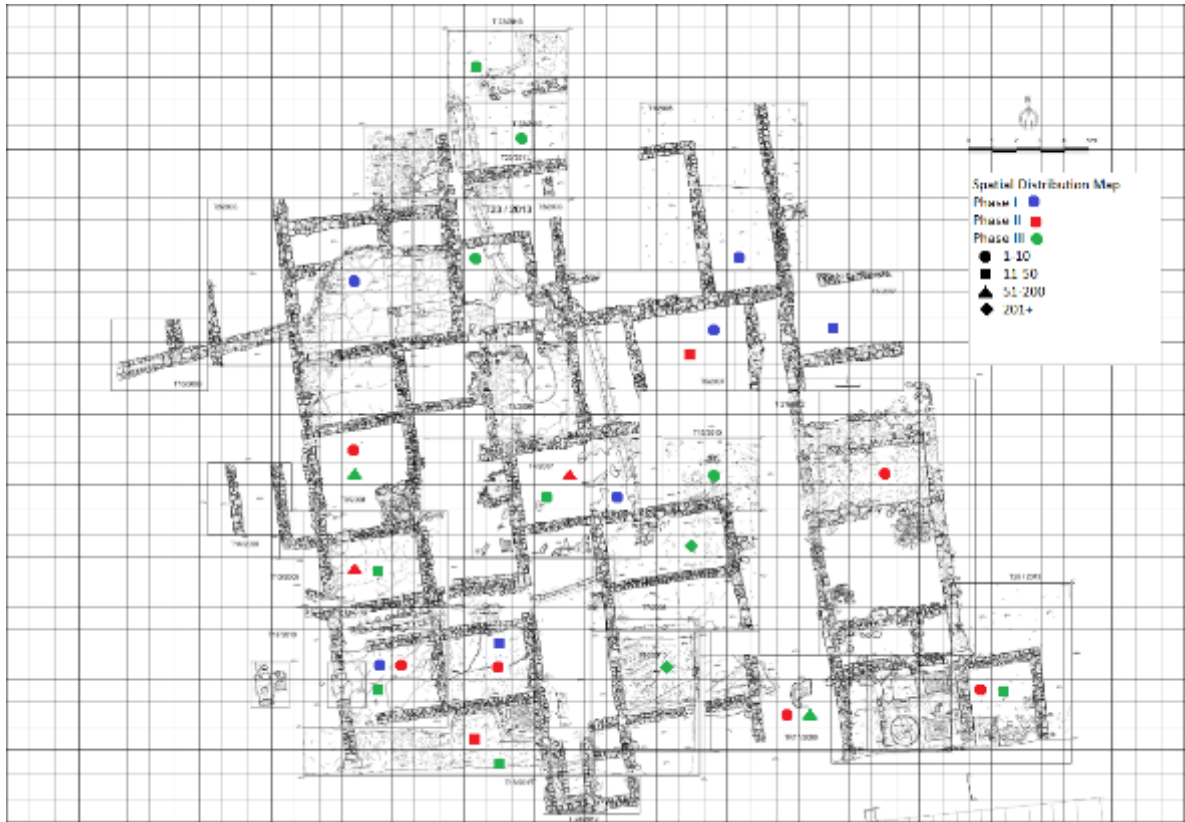
During Phase 3, blue fragments make up 662 of the 1187 fragments found, but other colours include amber, purple, and brown glass (see Table 7).

	Blue	Green	Colourless	Yellow	Amber	Marble	White
P3	662	219	139	84	45	13	2
	Brown	Painted	Red	Purple	N/A		
P3	3	3	1	1	15		

Table 7: Phase 3 colours.

It also has four times more rim fragments per capita than the other phases, ranging from 1cm to 30cm in diameter. This suggests vessels ranged from jugs and toilet bottles, to cups, bowls, and plates. It is known that the Roman diet consisted of many foods that may have been served or eaten using glass vessels, including honey, pork, dates, bread, fish, cheese, milk, cabbage, lentils, beans, melons, apples, and wine (Carcopino 1940:267,272).

A complete spatial distribution map (Map 4) shows areas where glass was found for all three phases of occupation (using different colours). It shows that glass was used or discarded all over the villa, but the main areas of activity are the western edge of rooms, and the peristyle and surrounding hallway. The majority of the fragments, over 1200, were found in the peristyle, hallway, and surrounding rooms; while around 250 were found in the western range of rooms (Areas 1-5 on Map 5).



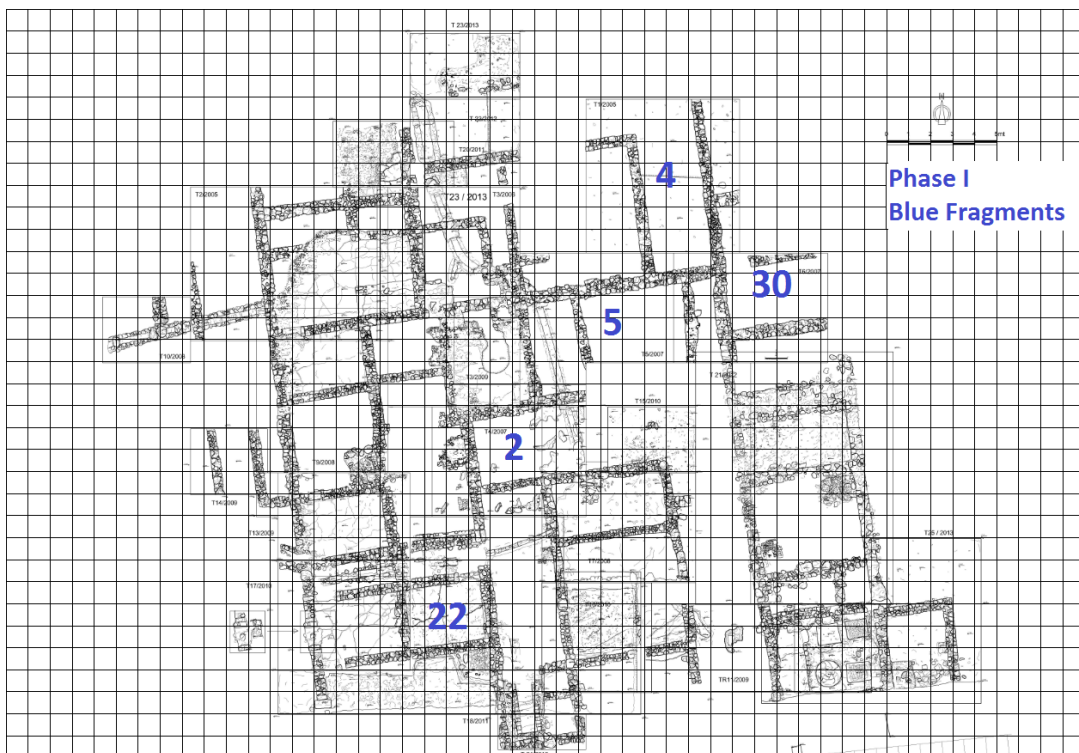
Map 4: The map shows the areas of the villa where glass fragments were found dating to all phases of occupation.

Overall, the majority of the fragments were transparent blue, green, yellow or colourless, but during the later phases new colours appear. Phase 3 has 67 base fragments, and 136 rim fragments, suggesting a large group of vessels being used in the villa at the end of its imperial occupation. The dataset does not give a complete picture of glass use at the villa and shows fill contexts of the exclusion pre- and post-occupation contexts, construction, recycling, and abandonment of the site (which are all quite similar); and not the habitation contexts that leave a different signature.

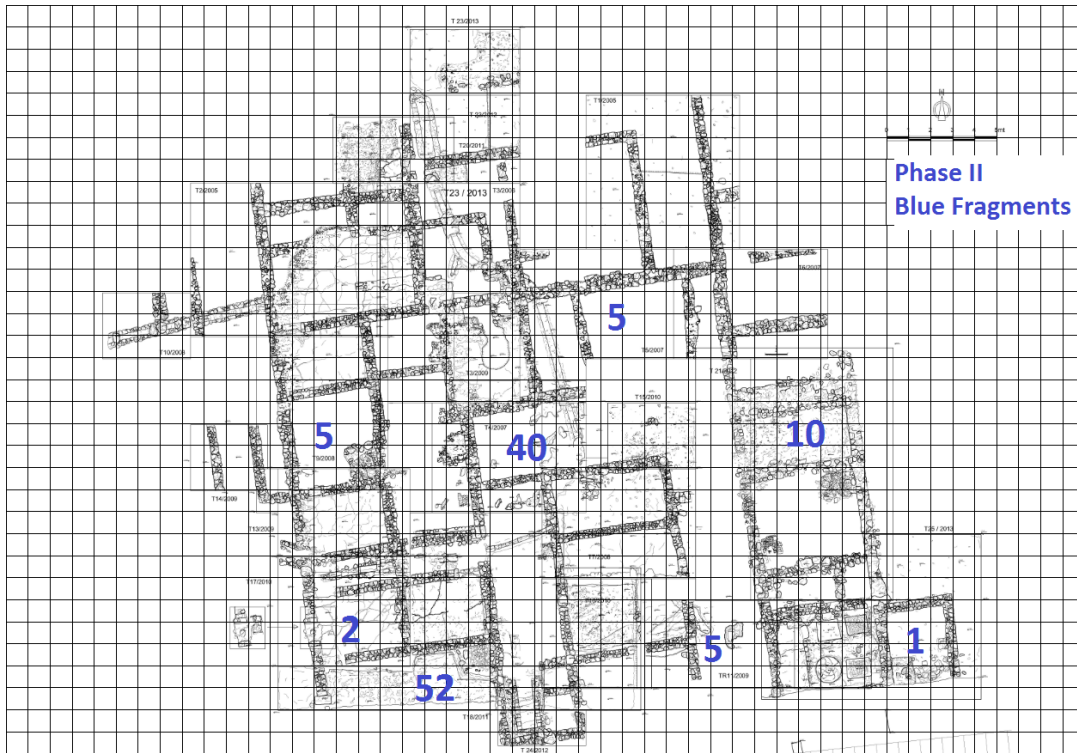
	Blue	Green	Colourless	Yellow	Amber	Marble	White
P1	62	8	4	10	0	0	0
P2	142	31	23	14	8	1	3
P3	662	219	139	84	45	13	2
Total	867	257	166	108	53	14	5
	Brown	Painted	Red	Purple	N/A		
P1	0	0	2	0	1		
P2	2	0	0	1	4		
P3	3	3	1	1	15		
Total	5	3	3	2	20		

Table 6: Table of colours found at San Felice.

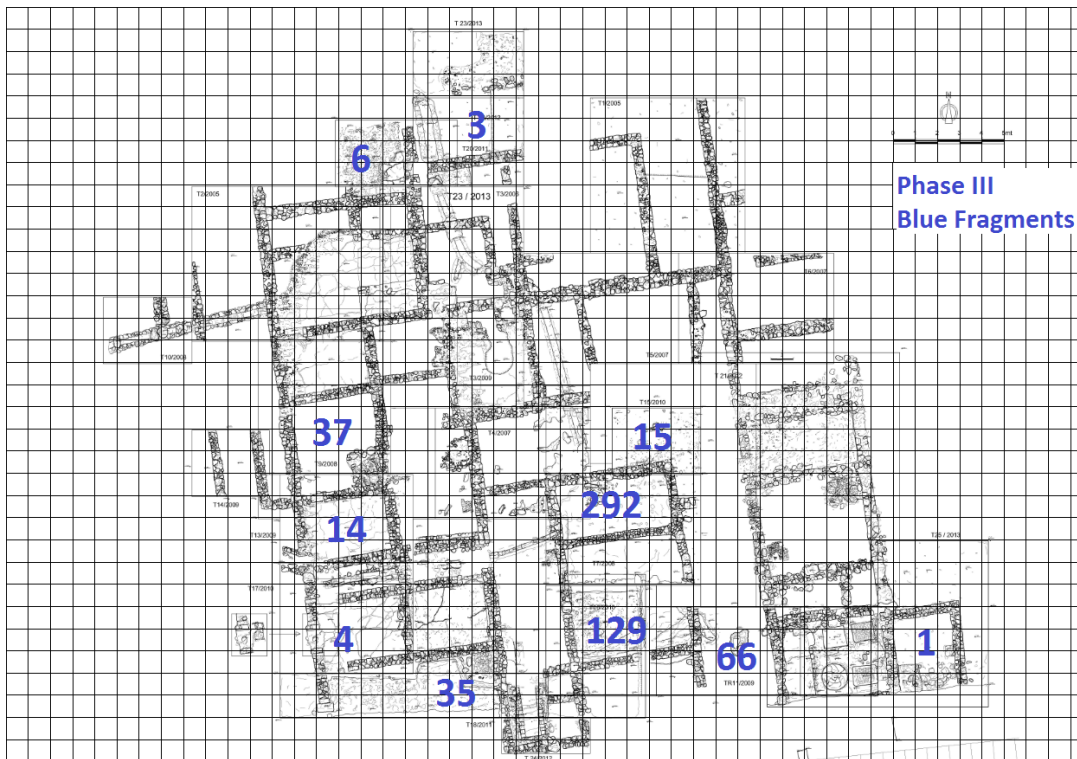
Spatial distribution maps were created for blue fragments found at the site (Maps 6, 7, 8). Blue was chosen because it was the largest dataset, and is the cheapest and easiest colour to produce, and likely buy therefore giving a better picture of common vessel distribution.



Map 6: Spatial distribution of Phase 1 blue fragments found at the villa.



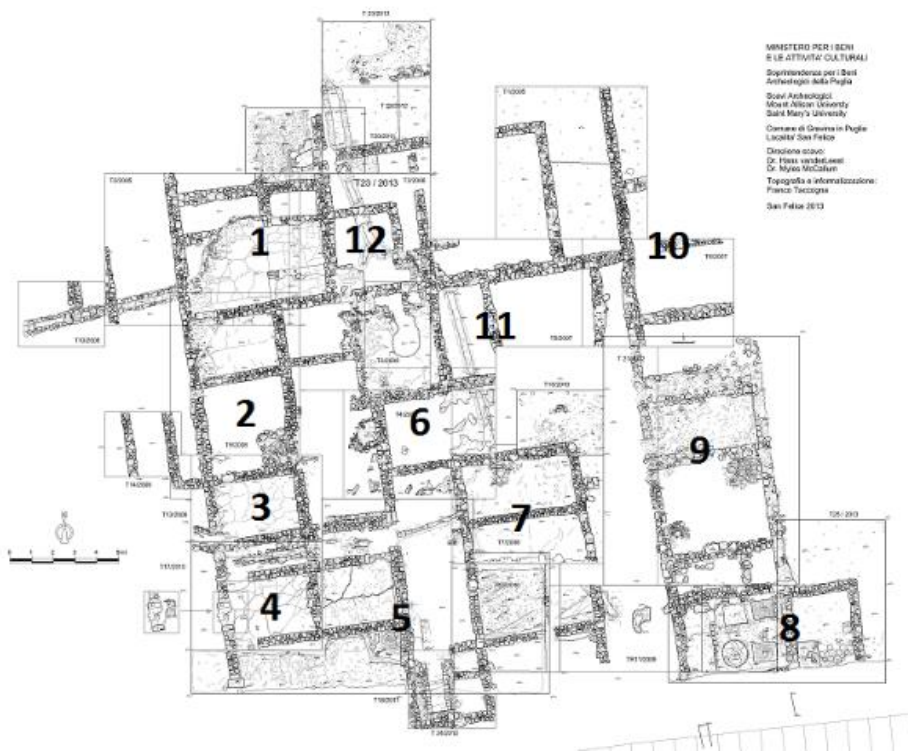
Map 7: Spatial distribution of Phase 2 blue fragments found at the villa.



Map 8: Spatial distribution of Phase 3 blue fragments found at the villa.

Maps 6, 7, and 8 show that blue fragments change in distribution between phases. The Phase 1 map (Map 6) blue fragments were grouped together in areas that are linked to the peristyle and industrial activities, while no fragments were recovered from the western range of rooms. During Phase 2 the map (Map 7) shows an increase in fragments and they are spread over a wider area. Map 8 shows Phase 3 where the distribution is focused on the western range of rooms, inside the peristyle, and the surrounding peristyle hallway.

ANALYSIS OF GLASS DISTRIBUTION AT THE VILLA



Map 5: This site map shows where each space (discussed below) in the villa is located.

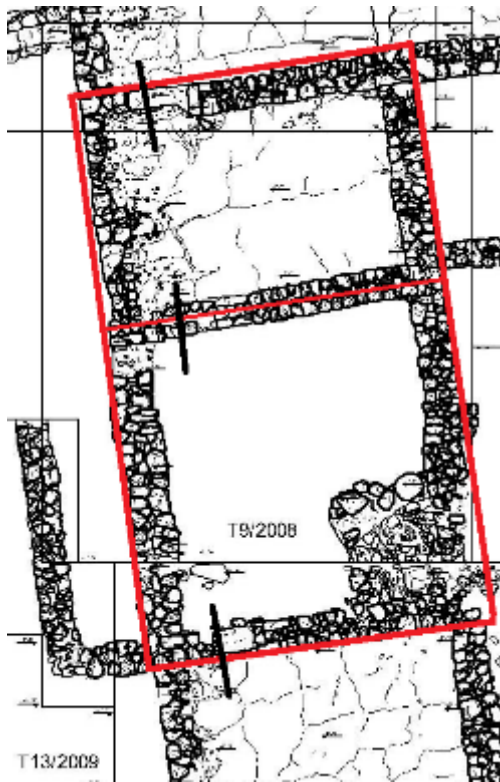
To analyse the relationship between the use of glass and functions of the spaces, I divided the villa into sections numbering 1 to 12. The spaces are based on trench placement and size, the presence of glass fragments, and other evidence provided by excavation records and site publications. North is at the top of each section below.



Area 1: Located at western edge of the villa.

This section of rooms has a doorway at its southwestern corner offering access to the rooms south of it. During Phase 1 the space consisted of three separate rooms, 1 large and 2 small rooms believed to have been storage areas. The rooms had beaten earth floors set with cobblestones. The walls were built using a dry-masonry technique. One glass fragment was found that could be dated to Phase 1 at the villa, 1 green body.

During Phase 2, the interior walls were knocked down to create one large room measuring 4.80 x 6.15 meters (McCallum et al. 2011:58). The beaten earth floor was covered with a waterproof concrete surface 0.1 meter thick (McCallum et al. 2011:58). McCallum speculates on the room's function points to a reception room for conducting business. No other glass fragments were found in this space for any of the occupation phases, providing little evidence for its function.



Area 2: Located at western edge of the villa.

This area is comprised of two rooms located just south of the large northwestern space. Both are connected by a doorway at their far western edge east to west, and with the rooms both north and south of them. Plaster wall surfaces were found in both

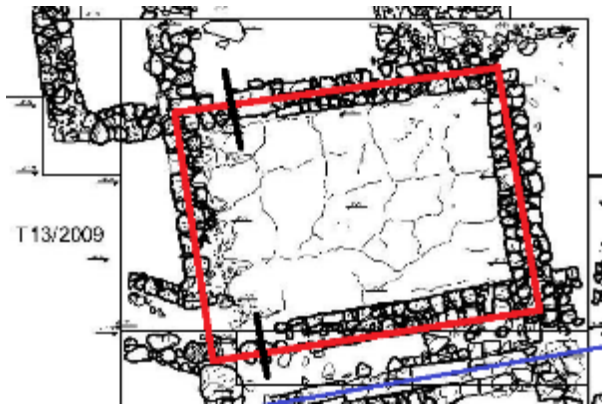
rooms but are difficult to date because they were placed on walls built during Phase 1, but the plaster was likely added during Phase 2 or 3.

The Phase 1 floor surface in the north room has not been preserved due to renovations during later phases. The room had a concrete floor and painted wall plaster by Phase 2, ranging in colour from red, yellow, blue, and black (McCallum et al. 2011:44). It has been suggested that during Phase 1 the room functioned as a *triclinium*, located off a large reception room. The south room is larger than the north one. The floor surface here has been badly damaged by ploughing, but during Phase 2 the room received a thick concrete floor surface. The remains of painted wall plaster has been recovered from this room as well, also pointing to a residential function.

There were no glass found in contexts dated to Phase 1. 5 fragments were found during Phase 2, 2 bases and 3 body fragments, all blue in colour. One EVE showed a vessel with a 3cm diameter base. During Phase 3, 52 fragments were found between the two rooms, with 3 rims and 3 bases identified. The colours for Phase 3 range from blue, green, marble, and yellow.

The EVE test on rim diameters show 1 vessel with a 25cm rim, and 3 with a 3cm rim, all blue. The rims for this trench have no photos available for a closer analysis. A large plate or dish would have a large mouth based on examples found in the Corning Museum of Glass catalogue (Whitehouse 1997, vol. 1). Large plates and dishes dating to the 1st century to early 2nd century CE have diameters of 14.9cm (Whitehouse 1997, vol. 1:15) and 17.6cm (Whitehouse 1997, vol. 1:68). Large mouthed jars also have a large

diameter, 15.8cm and 18.3cm (Whitehouse 1997, vol. 1:68). The 3 rims with a 3cm diameter could have many functions depending on their shape and construction. Vessels with similar size diameters are: toilet bottles (Whitehouse 1997, vol. 1:123), small mouthed jars (Whitehouse 1997, vol. 1:68), and pitchers (Whitehouse 1997, vol. 1:188).



Area 3: Located at western edge of the villa.

This small room is located north of the drain feature running east to west. The room connects to the other rooms both north and south by doorways at the far western edge of the walls. 2 glass fragments were found for Phase 2: 1 colourless body, and 1 green base with a diameter of 6cm. 25 fragments were recovered from Phase 3, including 1 complete blue rim with a diameter of 4cm that was grouped together with 10 other fragments forming an incomplete vessel (see Appendix A: SF1, SF2, and SF3). The bottle is likely a small toilet bottle, maybe even a candlestick *unguentarium* (Whitehouse 1997, vol. 1:149). The examples for bottles with small mouths and slender necks all date to after the villa was occupied but, an earlier version was likely used at the villa for perhaps cosmetics or medicine, or maybe scented oils. It is unlikely that the

vessel was large enough for tableware or a storage container because the small, thin neck would not support much weight. Many examples of candlestick *unguentarium* in the Corning Museum of Glass date to the 1st to 3rd centuries CE and have 1-3cm rim diameters (Whitehouse 1997, vol. 1:149-159). At least one example of a candlestick *unguentarium* has been found in a Vagnari cemetery grave dating to the late 2nd- early 3rd century CE (Prowse et al. 2010:190). One complete example of a vessel has a wide rim, flared out (similar to the fragments found at San Felice), and a long slender neck (similar in shape) that is connected to a globular body, and stands roughly 18cm tall (Whitehouse 1997, vol. 1:149-155).



Area 4: Located at western edge of the villa.

This room is thought to be the entrance into the *pars rustica* beyond the residential section (*pars urbana*). It measures 2.6 x 3.9 metres (McCallum et al. 2011:48). The room connects to each surrounding room, most significantly the room to the east. The eastern section has a raised floor level compared to the residential area and the

large 0.6 meter doorway is preceded by a stone step up to the room beyond. During Phase 2 the room was outfitted with a concrete floor. This room may be at the centre of the western side of the villa, extending 20 meters in each direction (the focus of excavation was the northern foundations that are closer to the surface), however there is no evidence yet to support this theory.

1 fragment for Phase 1 activity has been found; a body shard weighing 1.2 grams is all the information recorded into the database, offering little information. Phase 2 in Area 4 has 5 fragments associated with it, (see Table 8). There were 15 fragments found that date to Phase 3: 5 body shards and 2 rims (one fragment represents 50% of a complete red rim). The glass present in this room shows activity linked to glass vessels of an unknown purpose, perhaps a reception displaying the occupant's wealth and status. The area is situated just south of a Phase 2 drain that links to the peristyle basin.

	Total Fragments	Blue	Green	Yellow	Colourless	Red
P1	1					
P2	5	2	1	1		
P3	15	3	2		1	1

Table 8: Area 4 Table of colours.



Area 5: Located at southwestern corner of the villa.

This large section is based on most of Trench 18, including the rooms east and south of the main entrance room (Area 4), the eastern Phase 2 drain room, and a section of the peristyle hallway. The southern room can perhaps be linked to a residential function because the floor level is not raised. It has at least one doorway located in its north wall at its western edge (opening to Area 4), like all the rooms north of it. The room has not been fully excavated to its southernmost extent. The eastern room (between Area 4 and the peristyle hallway) has a raised floor level, resulting in the need for the step up to it. The room appears to have a doorway on its north wall and possibly one on its eastern wall leading out to the peristyle hallway.

Trench 18, which encompasses Area 5, had a digitized excavation diary where all the loci locations and their relationships are recorded. In most cases I was able to find the approximate location where the glass fragments were found in the four rooms.



Area 5: Loci locations for Trench 16.

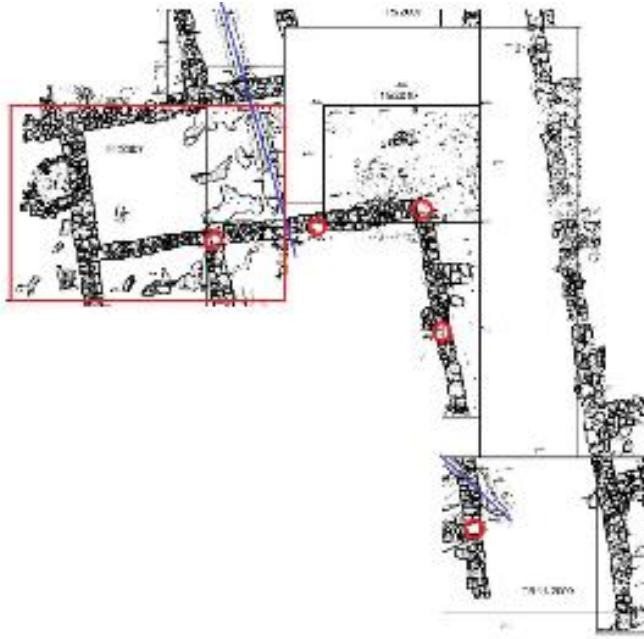
The map has been superimposed with the loci locations to show where the fragments are coming from (see Table 9). Some of the Phase 1 fragments were cut out of this map because they correspond with the peristyle and Trench 16 (only 2 of 26 Phase 1 fragments are therefore represented on this map, the rest are located to the east of this area).

	Area 5
Phase 1	2
Phase 2	9
Phase 3	55

Table 9: Area 5 table of fragments by phase.

The glass fragments for Phase 2 are concentrated to the north around the drain feature. Phase 3 shows a large scatter of pieces with at least 28 fragments in the south and centre rooms, 10 pulled from the fill packed into the doorway, and 22 in fill from the small drain room. There is a wide variety of colours represented in this assemblage, including amber and the only colourless decorated rim from the site (of 3 colourless rims).

The northernmost drain was capped with stones and could be easily traversed to gain access to the peristyle hallway from the western entrance. The south and centre rooms only had finds dated to Phase 3 contexts. See the glass catalogue for examples of Phase 3 glass (Appendix A: SF8, SF9, SF11, SF12, SF25). One vessel with a funnel shaped body and no rim was found to the extreme northwest of the trench along the north boundary (see Appendix A: SF8). The wide range of different fragments shows that during Phase 3 many colours and shapes for glass vessels were becoming available for the inhabitants at San Felice.



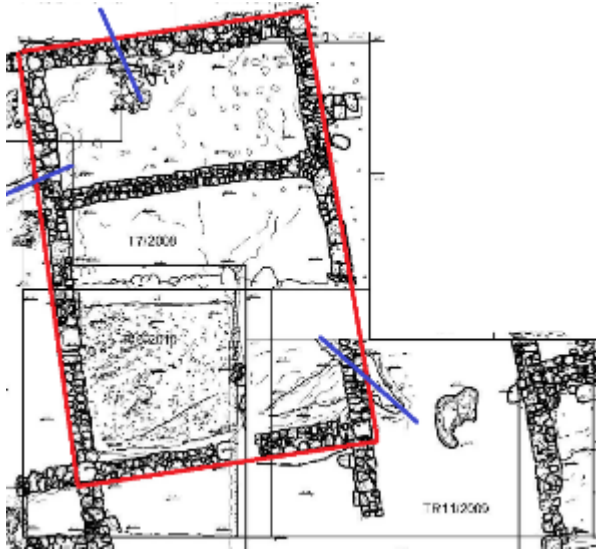
Area 6: Covered hallway surrounding the peristyle in the villa.

This space is the colonnaded hallway surrounding the peristyle (3 meters wide) (McCallum et al. 2011:41). The hallway is intersected by the drain running from the peristyle north to the edge of the plateau, away from the villa.

During Phase 1 the area had a beaten earth floor with cobblestones like many of the other rooms and likely connected with many of the surrounding rooms. The area was renovated during Phase 2 and received a plaster floor surface that raised the floor level around 0.2 meters (McCallum et al. 2011:56). This elevation may have made it easier to walk between the hallway and the northwestern rooms (McCallum et al. 2011:57). This area had radiocarbon dating on charcoal samples, dating a hearth feature to Phase 2 (McCallum et al. 2011:57). The function of the hearth has not been determined but indicates a possible food preparation area.

Phase 3 changed the area drastically; the peristyle and the hallway were divided up into smaller rooms, perhaps animal pens or other pastoral activity. The floor surface also changed to a brownish-yellow clay (McCallum et al. 2011: 62).

5 fragments are associated to Phase 1, 2 blue body fragments and 3 yellow fragments (1 base, 1 body, 1 rim). Phase 2 has 60 body fragments; 1 handle; 12 rims; and 2 bases. The colours in Area 6 include the usual blue/green/yellow, but also amber, marble, and brown. 6 rims were subject to the EVE test and gave rims with diameters of 1.5cm, 3cm, 4cm, 9cm, 14cm, and 18cm. Since the hearth is also associated with this area it is likely that some of the vessels represented here were related to serving or holding food. Many of the fragments found had comments noting the shape was slightly curved, indicating a shallow form; and the large rim diameters of many of the vessels (see Table 6) also suggest a shallow dish or plate. The smaller rim diameters could be showing bottles, a pitcher with a handle, plates or bowls for food. There are no fragments associated with Phase 3 contexts in this area.



Area 7: The Peristyle.

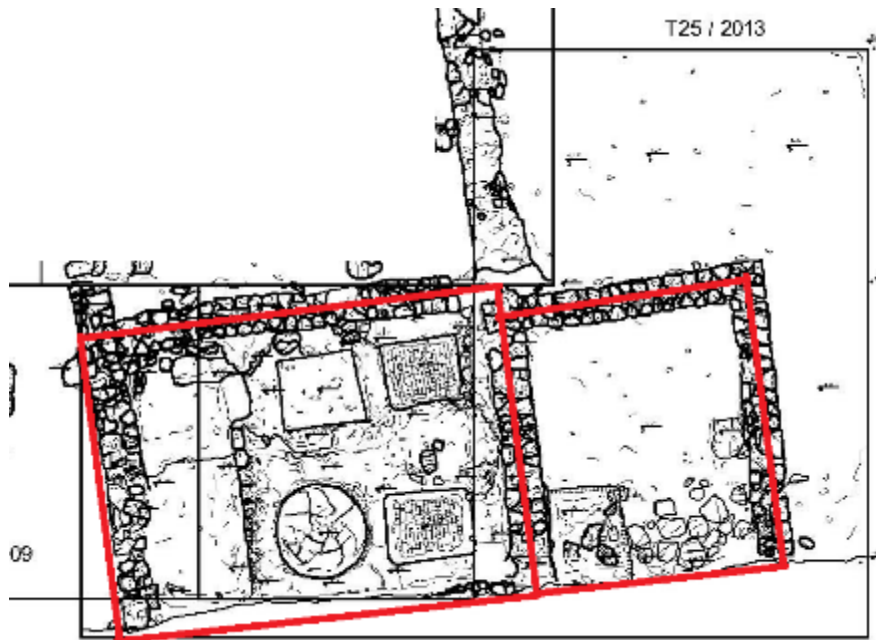
The peristyle is an important feature of the villa, located in the centre of the building. The area functioned mainly as a water collection area until Phase 3. The basin has two drain channels running away from it, to the north and to the west, and was likely fed by a spring to the southeast.

Phase 1 evidence has been largely destroyed due to later construction, but the space was one open space. During Phase 2, the room was bisected with a dry masonry wall at least 0.45 meters in height (without removing the columns at the ends) and was covered with painted plaster (McCallum et al. 2011:54). This created a space in the north with a barrier overlooking the water feature (McCallum et al. 2011:55). The functions of the Phase 1 *impluvium* and the Phase 2 basin are uncertain. The basin may have functioned as an industrial space, providing water needed for wool processing or textile production; or the pool was a decorative and functional element, providing water for household residential use.

The Phase 3 peristyle was very different. The basin was filled in with refuse and covered by a wall collapse containing limestone, tiles, and column bricks (McCallum et al. 2011:60). The larger basin area was divided up into small rooms using a range of materials including unshaped field stones and, rough and unhewn limestone (McCallum et al. 2011: 60). A millstone was also found in the southwestern corner of the peristyle, dating to Phase 3.

The peristyle area was excavated in three different trenches. The main trench covers the top-mid section, while the southern portion was divided in 2. The overall area had a total of 773 fragments recovered, mostly from the midden deposit filling the water feature (indicating activities from Phase 2 and early Phase 3). There were 47 base, and 623 body fragments, 9 handles, and 92 rim pieces recovered dating from Phases 2 and 3. The colours found in the peristyle assemblage include: (3) amber, (41) blue, (1) brown, (1) colourless, (31) green, (1) purple, and (14) yellow.

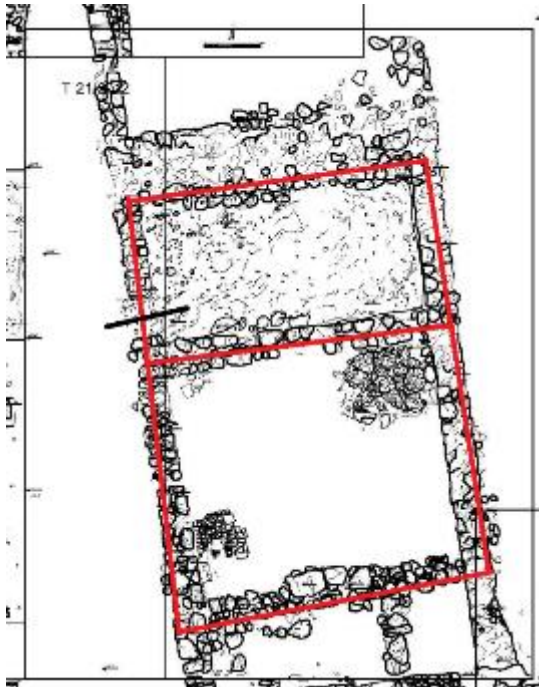
The Phase 3 group had 43 EVEs (see Table 6) taken from rim fragments found in the peristyle, including 2 100% complete rims measuring 2.0cm and 2.7cm in diameter. Many of these rims are hollow, meaning they were folded back to create the lip of the vessel; while many of the rims have bubbles, likely indicating they were blown (introducing air into the glass that creates bubbles that do not have time to escape before cooling). The rim diameters range from 1cm to 30cm; this shows us that during the end of Phase 2 and early Phase 3 while the peristyle was being filled in with household refuse, the peristyle had access to a wide range of different vessel types for use in the villa.



Area 8: Basin room at southeast corner of the villa.

The southeastern most rooms are clearly connected to agricultural processing; one room contains 4 basins and was perhaps used for olive oil and wine production, while the eastern room seems to stand alone until further excavation is done. Three of the basins are rectangular and tiled on the bottom, while the other is a large ceramic *dolium* set into the ground (large enough to hundreds of liters of liquid). The small platform between the basins is speculated by excavators to have held the press. The eastern room has little evidence for its function, perhaps storage for goods or tools.

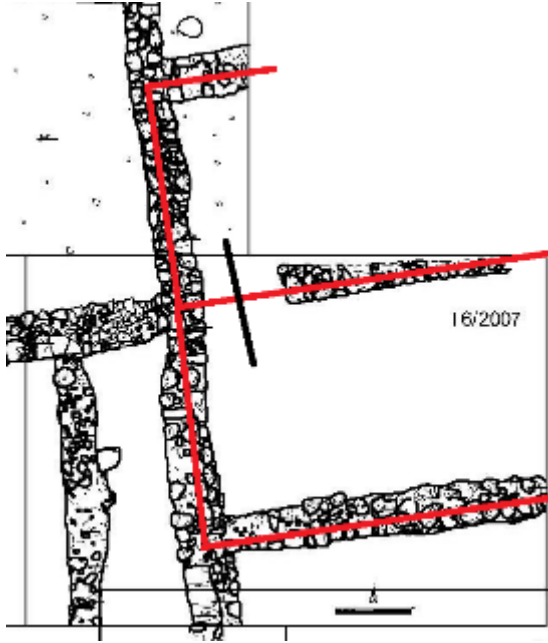
30 glass fragments were found between the two rooms, one dating to Phase 2 and the rest to Phase 3. One fragment may have been window glass; it is dark green and flat, with one pitted and one smooth side, although the fragment is very small. The fragments range in colour from (8) blue, (12) green, and (1) colourless.



Area 9: Located at eastern edge of the villa.

This range of rooms is located off the eastern side of the peristyle hallway, north of the basin room. The rooms appear to open out to the hallway but do not connect to each other, although in most cases the walls are preserved below the floor level so entrances are impossible to identify. The small centre room was likely a storage area at some point, due to the ceramic *dolia defossa* (partially buried containers) recovered *in situ* in the floor and is linked to Phase 2 and 3 activity.

Only 10 fragments were recovered from this span of rooms dating to Phase 2. All the pieces were blue body fragments.

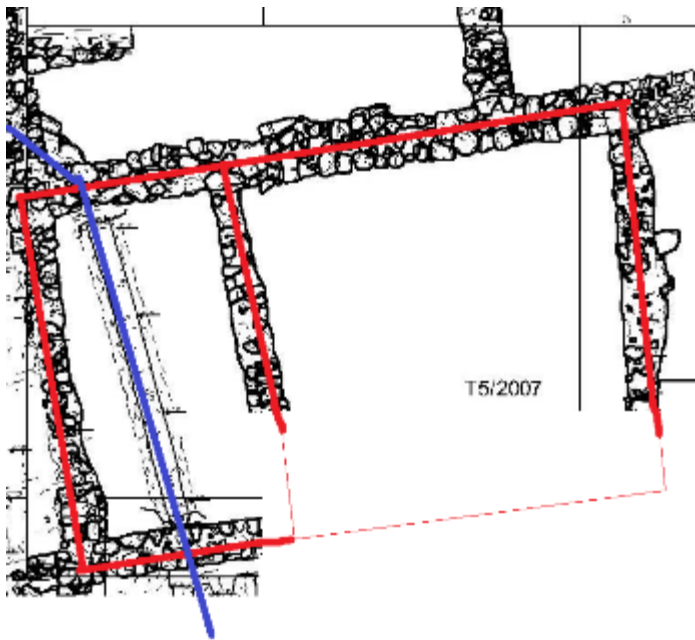


Area 10: Located at the northeastern edge of the villa.

The floor surface of this area has been ploughed out and destroyed. The north and south spaces were possibly linked together by a door at the western end of the dividing wall. It is unclear if they open to the peristyle or connect to the room to the south (Area 9).

There were 37 fragments dating to Phase 1 found here: 1 base, 26 body, and 10 rims. Colours included: (5) Yellow, (1) green, (30) blue, and (1) red fragment with decoration. 6 of the rims have a recorded EVE and had diameters of 4cm (100%, 98%, and 15%), 6cm, 16cm, and 30cm. No photos are available for Trench 6. The only example for a rim of 4cm in diameter was a bottle with a collar-like rim, dating from the 1st to 3rd century CE that was connected to examples from Pompeii and Herculaneum in 79 CE (Whitehouse 1997, vol. 1:232). A closer look at the construction of the rims is necessary for further interpretation (no photos available), depending on the intended use of the

vessel the construction of the rim effects how it can function. Small thick rims are more suitable for sealing than a thin, delicate design. Vessels with a 6cm rim diameter range appear to be beakers (Whitehouse 1997, vol. 1:109-119) and cups (Whitehouse 1997, vol. 1:84-88). Beakers and cups have many different styles and shapes. The larger diameters, 16cm and 30cm, were perhaps large open-face vessels, like plates or bowls.

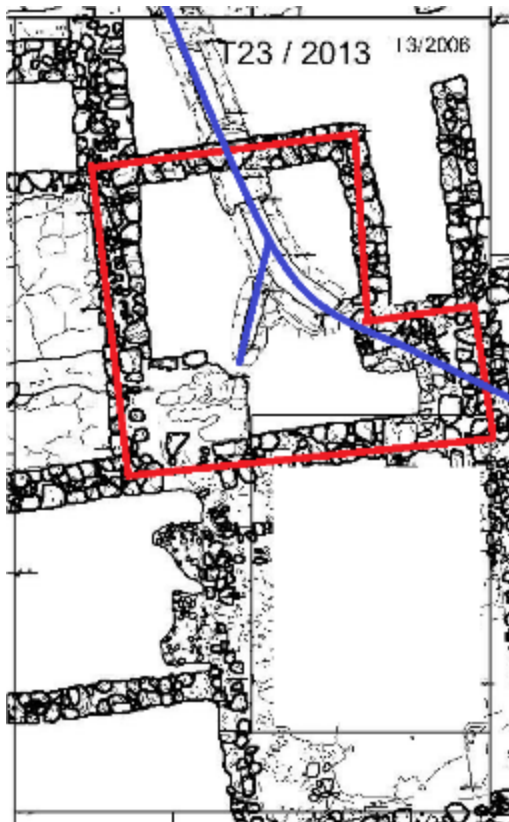


Area 11: Southern section of the northern drain.

These foundations seen on the map that look like walls extending south were constructed after the villa was abandoned. The trench for Area 11 encompasses the northern drain. The drain runs north away from the peristyle using a large (0.55 meters both wide and deep) channel, coated in waterproof concrete (*opus signinum*), and

capped by limestone blocks of various sizes, all mortared together with the same concrete (McCallum et al. 2011:39).

Glass fragments found here date to both Phases 1 and 2. All pieces were body shards except 1 Phase 1 blue rim with a diameter of 14 cm (only 6% of the rim remains). The colours found here were (1) amber, (10) blue, (7) colourless, (2) green, (1) red and (6) yellow during Phase 1, and all but red appear in the Phase 2 contexts. No photos are available for a closer analysis of the fragments or the rim. The rim has a diameter of 14cm and was perhaps used as a bowl or plate.



Area 12: Northern section of north drain.

Area 12 includes a section of the drain feature, just north of the rooms surrounding the peristyle, but still presumably connected in function because it shares the raised floor level. The downspout is attributed to a cloth press that created waste, washed away by the channel.

5 glass fragments were found, (3) blue and (2) colourless, that were dated to Phase 3. One fragment found was a complete neck with half of a rim (17).

CHAPTER VII: CONCLUSION

The villa at San Felice was both a villa *rustica* and *urbana* during its three phases of occupation and had close ties with the nearby Vagnari *vicus*, and likely other settlements in southern Italy that were occupied between the 1st century BCE until the mid-2nd century CE. The view is impressive from the plateau the villa is situated on, and was a prime location for a small trade centre being so close to the Via Appia. As the villa was revitalized during the 1st century BCE, the popularity of glass was also increasing.

The renovations show that the villa was valued as an asset to the imperial period landowner and that money was spent to make it both more productive and more comfortable for the occupant. The peristyle remained a centre of household activity during Phase 1 and 2, because of the renovations to the central water feature and the insertion of plaster walls and floors. The extensive renovations of the peristyle and surrounding rooms during Phase 3 illustrate the drastically changing function of the space for pastoral or agricultural activities. The function of the western range of rooms remains more constant between the phases, and provides evidence of colourful painted wall and floor surfaces.

The under-representation of Phase 1 in the glass finds at the site can be linked to construction and renovation activities that replaced many of the floor surfaces throughout the villa. The lack of finds could point to the collection of broken fragments for recycling at Vagnari or elsewhere, or they could reflect a limited availability to glass vessels and a reliance on ceramic vessels. It must also be remembered that glassmaking

had significant advancements in technology during the early life of the villa, and had only recently become cheap and easy to manufacture. In contrast, the over-representation of Phase 3 in the archaeological record could be indicative of ongoing activity from Phase 2. Glass vessels and containers were reused and repurposed and many likely survived from the previous phases at the villa. Many of the fragments could have come from other garbage dump material from Phase 2 that was used as fill in construction during Phase 3.

Using material-culture dynamics, qualitative, and quantitative methods of analysis based on the historical context provided, it is possible to interpret the use and distribution of glass fragments. By looking at the evidence surrounding the glass fragment, like hearth features or painted plaster, sometimes a possible function can be identified. Using museum collection catalogues as a sources of reference was extremely valuable when looking at vessel shapes and rims on complete vessels to compare to certain San Felice pieces that have diagnostic characteristics, like decoration or a distinctive shape.

The dataset showed a large quantity of body and rim fragments. Out of the 182 rim fragments, 85 have a recorded EVE (see Table 6). They range greatly in size and indicate that all shapes of vessels were being used at the villa. Small rim diameter vessels usually function as containers for cosmetics, medicine, cups, jugs, flasks, or pitchers; while larger diameters usually belong to open-mouth vessels like plates or bowls. Phase 3 has six times as many EVEs and five times as many estimated vessels being represented, but may represent vessels that survived for long periods of time

before they were either broken or discarded in the peristyle midden or partially collected for recycling. The wide range for EVEs confirms that the occupants of the villa were using many different shapes of glass vessels in daily life at the villa. At least twelve examples of handles are represented in the dataset that range in size and colour. Vessels using handles were jugs, some cups, certain forms of bottles, and pitchers.

It is not surprising that blue is the most common colour found because it is cheap and easy to create. For Phase 1, blue makes up 62 of 87 fragments which is consistent for the time period. A portion of the fragments were decorated, showing examples of ribs, incised designs, and applied decoration. This shows that the occupants were able to afford glass vessels that may have cost extra rather than a cheap, plain container. The presence of small or closed-mouth containers could be due to the purchase of the contents rather than a choice based on style or colour. As already discussed, other factors influence the presence of vessels, like personal choice and social factors.

The wide variety of colours and decorations found in the dataset suggest that the villa definitely had access to glass made by at least a moderately skilled glass maker. Otherwise, the vessels at San Felice were acquired by trade with the villa using the Via Appia. Only a small amount of the Vagnari site has been excavated so little evidence is available about the activities conducted there. Glassmaking at Vagnari could have focused on the first stage of production, creating blocks of glass for future shaping, because no evidence of glassmaking furnaces or blowpipes were found at the site, only slag. Slag is created when sand or broken glass is melted at high temperatures, and is not a definite sign of glassmaking. The villa and the *vicus* cemetery have found glass

vessels during excavation signifying that glass was important enough to place in a grave for the afterlife.

Looking at the spatial distribution, glass vessels were used all over the villa and were not confined to certain areas. Glass had a definite presence in the western range of rooms which are believed to have been the *pars urbana* of the villa, and used for activities like dining, entertaining and sleeping. In the peristyle and surrounding hallway that functioned as the *pars rustica* and would have hosted activities like weaving, cooking, and water collection. The occupants at the villa lived in comfort during Phase 2, they had a large water feature, pressing facilities, and painted plaster floors and walls throughout many of the rooms. The substantial complex of rooms and facilities seems to have been quite profitable for the imperial *fiscus*, and would have been able to acquire numerous glass vessels for use or display within the villa. The most complete vessels in the dataset are small toilet bottles that could have been used for make-up, scented oils, or medicine. Evidence of animal butchering inside the peristyle midden, the presence of millstones, and seeds found during excavation show that glass may have been used to hold a wide variety of foods within the home. Wine was being manufactured at the villa suggesting that the occupants would have had plenty of wine to drink, requiring pitchers and goblets for serving. More research is needed on glass at the villa to be certain of its use and function at the villa. The vessels at San Felice range in rim diameter from small to large, indicating many shapes and sizes of the vessels. Many colours were found, suggesting trade or access to local production. There is a definite increase in the presence of glass over time at the site, especially between the pre- and post-imperial

occupation periods, corresponding with the rise in popularity of glass and the introduction of new technology and techniques, although other factors must be considered.

NOTES

¹ When speaking about certain dates the abbreviations BCE and CE are used to distinguish between 'before the common era' and the 'common era'.

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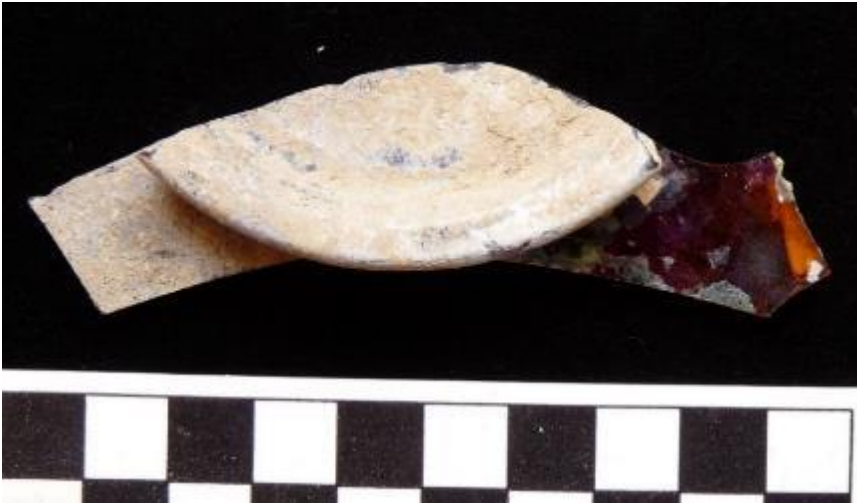
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APPENDIX A: CATALOGUE OF SAN FELICE GLASS FRAGMENTS

SF1



SF 12-215- 2009

Locus 12009 (Phase 3)

Entries 1, 2 and 3 are believed to form the same vessel. This fragment contains a section of the base and the bottom of the body. The amber base is concave.

SF2



SF 12-256- 2009

Locus 12009 (Phase 3)

This photo shows the rest of the amber base, folded rim fragments, and pieces from the body of the vessel.

SF3



SF 12-256 -2009

Locus 12009 (Phase 3)

This group has more of the folded amber rim and a small group of body fragments.

The three entries together form the base of a shallow amber dish, maybe a bowl or a plate.

SF4



SF 12-222- 2009

Locus 11016 (Phase 3)

A small blue glass vessel. Some of the rim and the base have survived, as well as the entire neck and most of the shoulder. It measures 6.7cm long, and was found in the southeastern area of the peristyle hallway/peristyle.

SF5



SF 12-217 – 2009

Locus 11014 (Phase 3)

The blue body fragment is very round in shape, and may be connected to entry 4 above.

SF6



SF 12-217- 2009

Locus 13008 (Phase 3)

This entry shows a complete blue rim with a 4cm diameter and some neck fragments. The fragments were found in room 3 of the villa (just north of the western drain in the residential section). The vessel was perhaps a toilet bottle for cosmetics or oils.

SF7

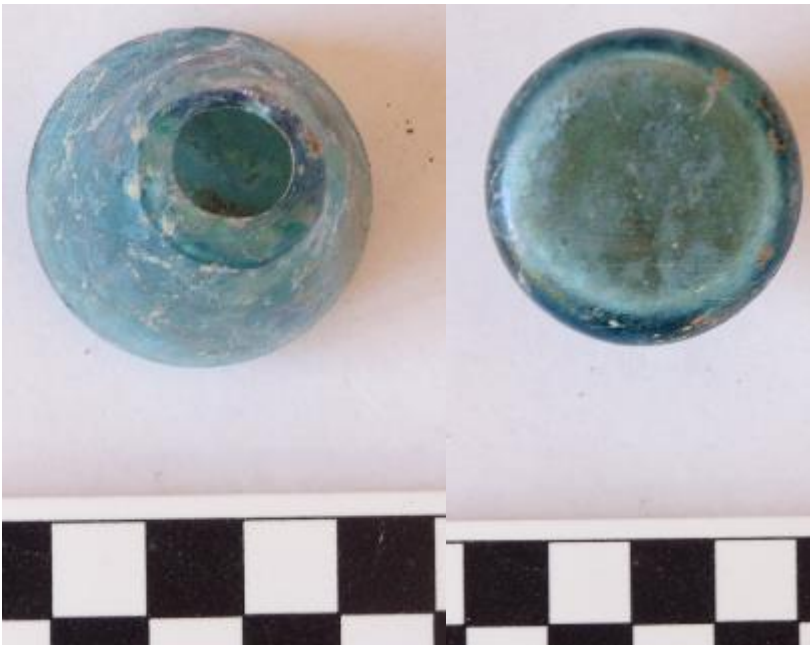


SF 16-12 – 2010

Locus 16004 (Phase 3)

This is a complete blue rim found in the southwestern section of the peristyle.

SF8



SF 757-12 -2011

Locus 18001 (Topsoil)

The complete blue vessel body and base was found near the western drain room just off the peristyle hallway. The vessel is associated with the topsoil layer and is therefore not in the dataset.

SF9

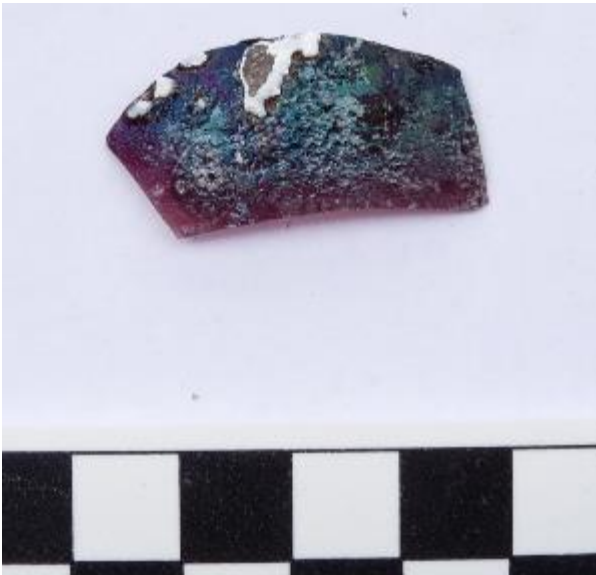


SF 816-12- 2011

Locus 18019 (Phase 1)

This photo shows a light blue complete rim and two neck or body fragments. The rim is not a perfect circle and is much thicker on one side.

SF10



SF 804-12 -2011

Locus 19010 (Phase 2)

One of the few purple glass fragments found at San Felice. The pieces is concave and the outside surface is pitted. The curvature of the piece could be from a shoulder or a rounded body.

SF11



SF 884-12 – 2011

Locus 18062 (Phase 3)

These two fragments have a painted with a geometric pattern.

SF12



SF 764-12- 2011

Locus 18001 (Topsoil)

A dark blue rim and handle fragment. Perhaps a pitcher or jug.

SF13

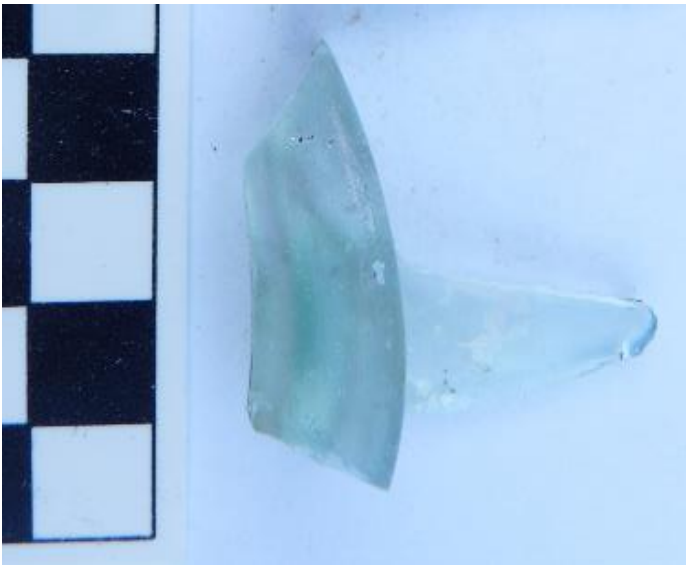


SF 822-12 – 2011

Locus 19023 (Post-Occupation)

A flat clear base, almost complete. The group was found in a post-occupation phase context, but is an example of the range in base style.

SF14



SF 895-12 -2011

Locus 19033 (Phase 3)

A light blue rim. The rim flares out and has no neck, resulting in a wide shoulder (and the fragment jutting away at such a sharp angle). The vessel was perhaps a bottle, jug or jar, and may have had a handle.

SF15

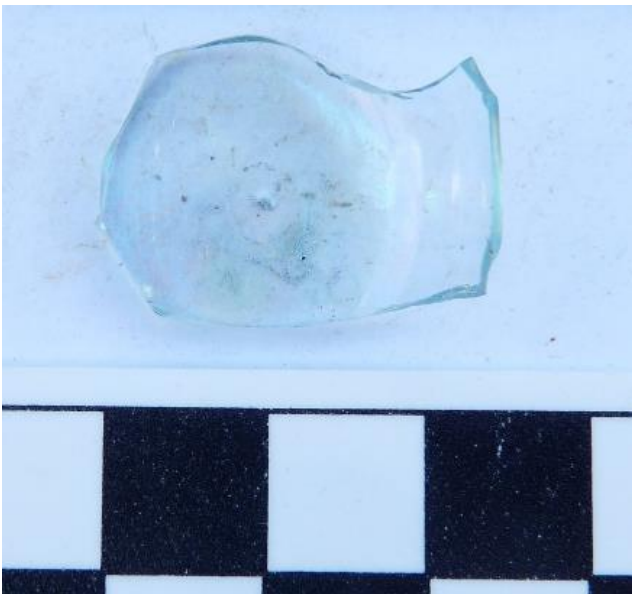


SF 898-12- 2011

Locus 20009 (Phase 3)

The photo shows part of a rim and an elongated neck of a small blue vessel. The rim looks unfinished and flares outward.

SF16



SF 901-12 -2011

Locus 20009 (Phase 3)

This entry is a blue base fragment (is not complete, EVE 12%). The base is flat and has no foot-ring, and is very small with a 3cm diameter.

SF17



SF 945-12 – 2013

Locus 23005 (Phase 3)

A mostly complete blue neck and rim piece. It measures 4.2cm long and has a distinctive production mark on one side of the neck. This fold in the glass was likely made by a tool used to clamp the neck while reheating to shape the rim (Stern 1995b:20).

SF18

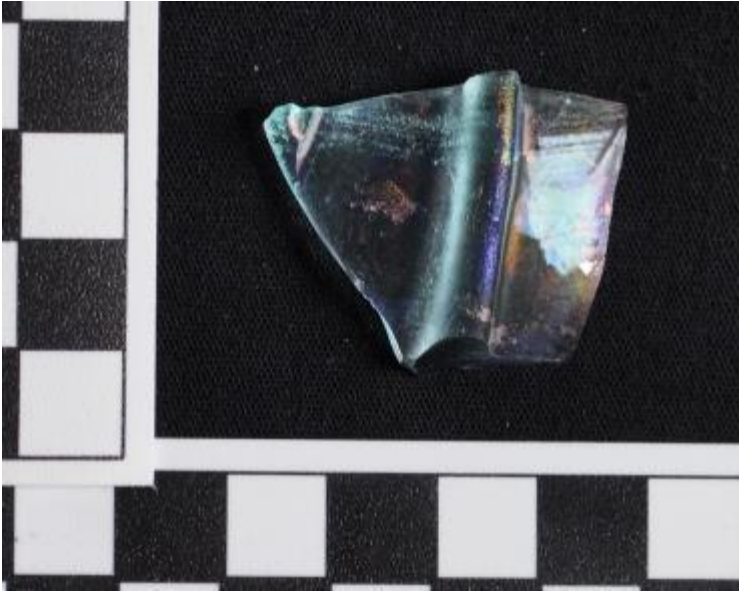


SF 956-12 -2013

Locus 25026 (Post-occupation)

This group shows blue rim and body fragments incised with a line. The rim is thin and flares out. The fragments were found near room 12 and are connected to the post-occupation phase at the villa.

SF19



SF 52-12 -2010

Locus 16009 (Phase 3)

The fragment is a clear blue tinted fragment with decoration, and possibly more decoration on the point of the fragment. (Unclear if the fragment is also a rim).

SF20



SF 39-12 -2010

Locus 17007 (Phase 3)

A complete green rim. The rim may have belonged to a bottle or a jug.

SF21



SF 69-12 -2010
Locus 17007 (Phase 3)
The fragment is part of a blue rim and neck.

SF22



SF 88-12 -2010
Locus 16007 (Phase 3)

A complete green foot-ring base. The centre is concave and a few tiny pieces of the bottom of the body are still attached.

SF23



SF 79-12 -2010

Locus 16006 (Phase 3)

The photo shows a light blue ribbon handle. It was found in the southwestern peristyle area (in Trench 16).

SF24



SF 117-12 -2011

Locus 16004 (Phase 3)

2 green handle fragments. One fragment shows where the handle would have adhered to the vessel (applied after the vessel body was formed). Could also be applied decoration.

SF25



SF 777-12 -2011

Locus 18050 (Phase 3)

This fragment is a colourless decorated body piece. It shows a ribbed pattern on the surface, found in a fill layer in the centre of the southwestern most room (5).

SF26



SF 107-12 -2010

Locus 16004 (Phase 3)

A different style of rim. Found in the southwestern section of the peristyle. Light green in colour and is 8.2cm in length.

SF27

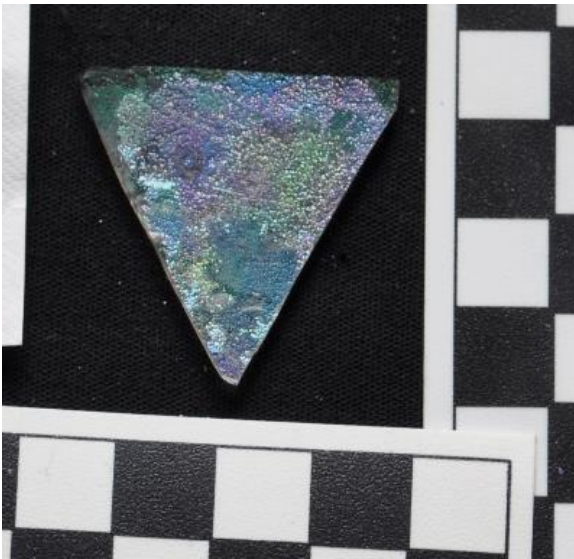


SF 12-11 -2005

Locus 1005 (Post-occupation)

This group consists of three blue rim fragments with pieces of the vessel neck. They were found in the extreme northeastern section of the villa.

SF28

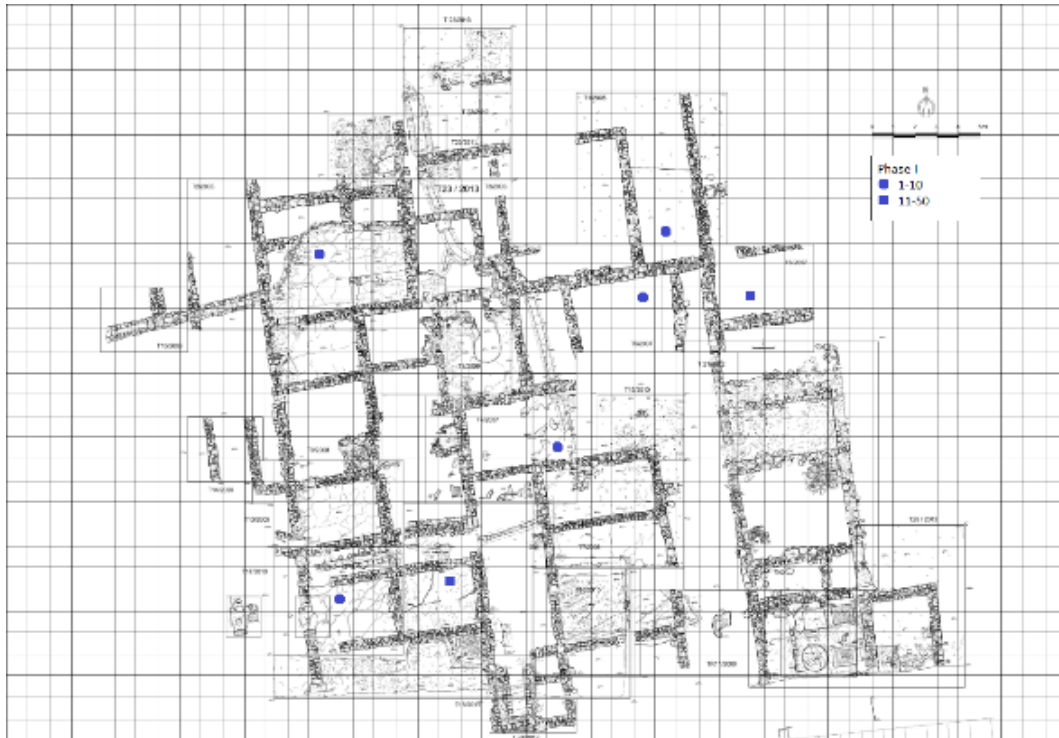


SF 05-12 -2010

Locus 16009 (Phase 3).

A flat glass fragment, perhaps window glass. One side is pitted, while the reverse is smooth. Found in the southwestern peristyle area.

APPENDIX B: SPATIAL DISTRIBUTION MAPS



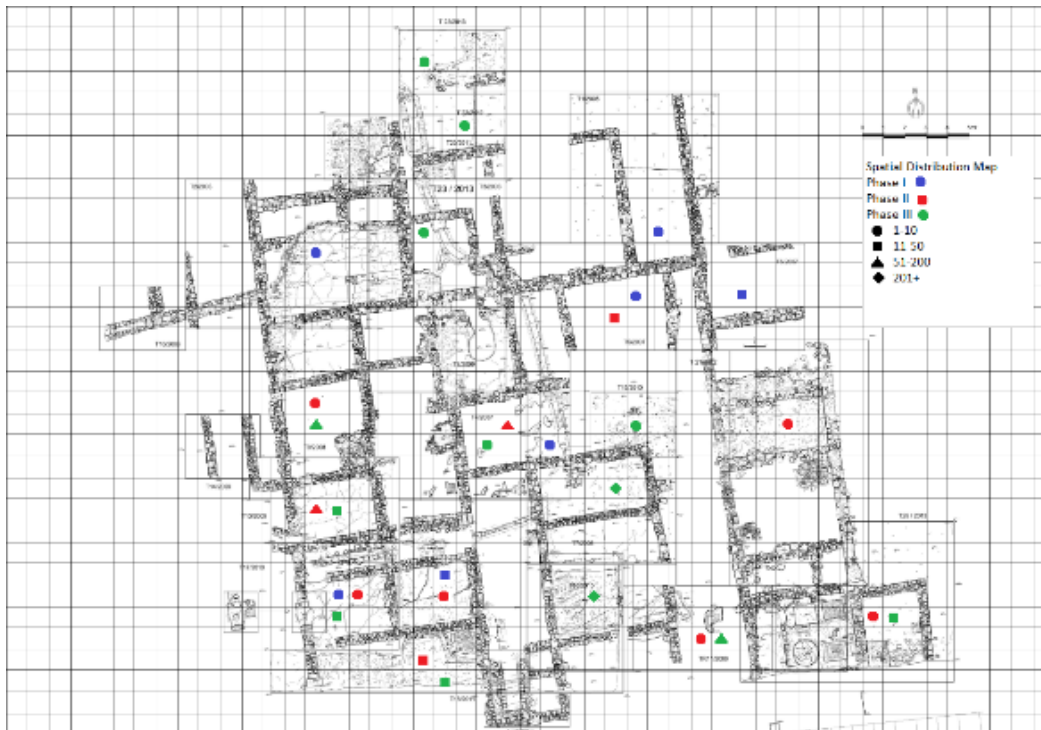
Map 1: This map shows the scatter of fragments associated to Phase 1.



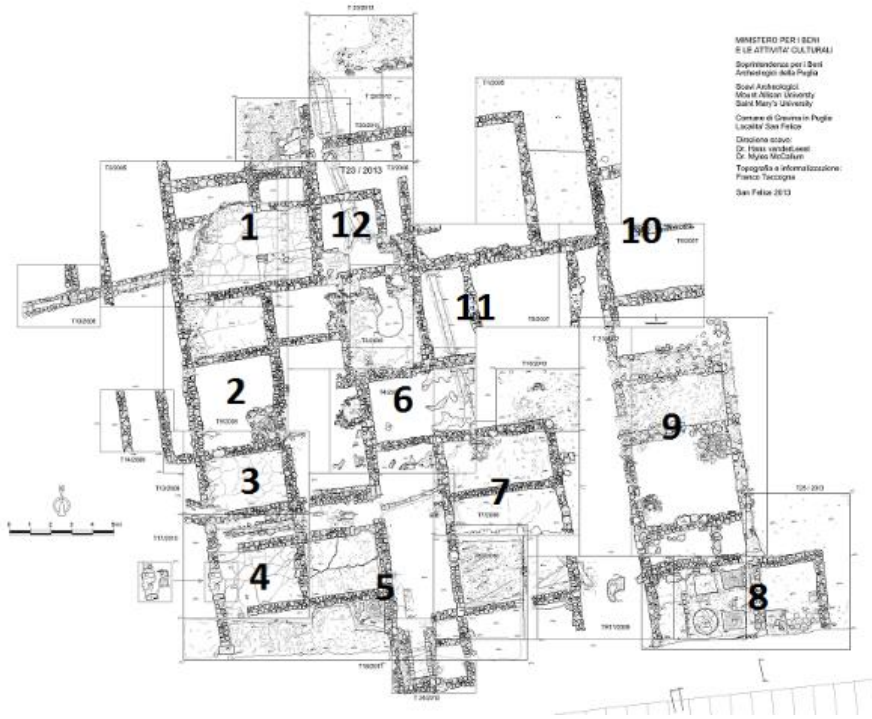
Map 2: Phase 2 shows an increase in the density of fragments at the western edge.



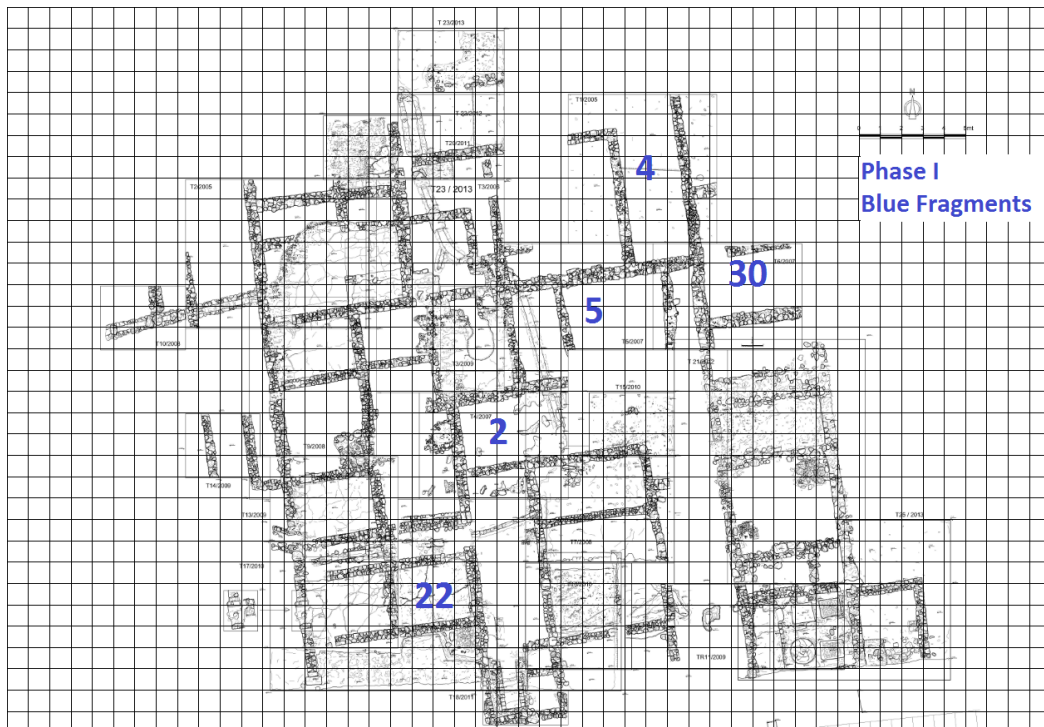
Map 3: The map for Phase 3 shows glass activity in the house is more represented.



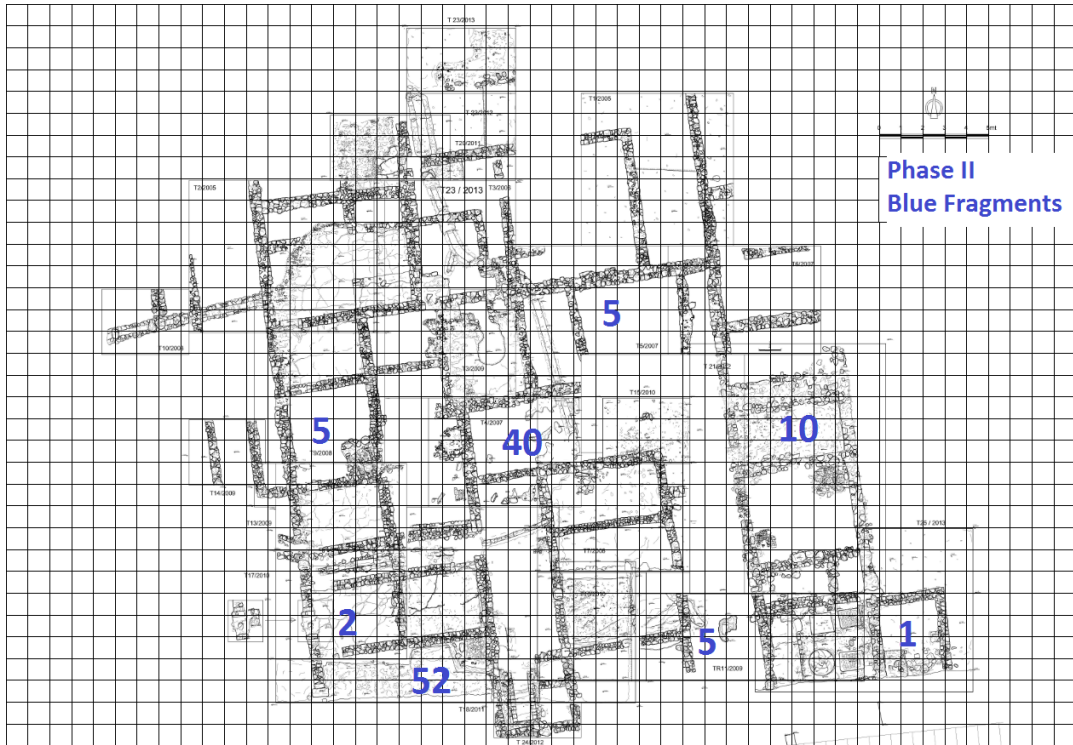
Map 4: The map shows the areas of the villa where glass fragments were found dating to all phases of occupation.



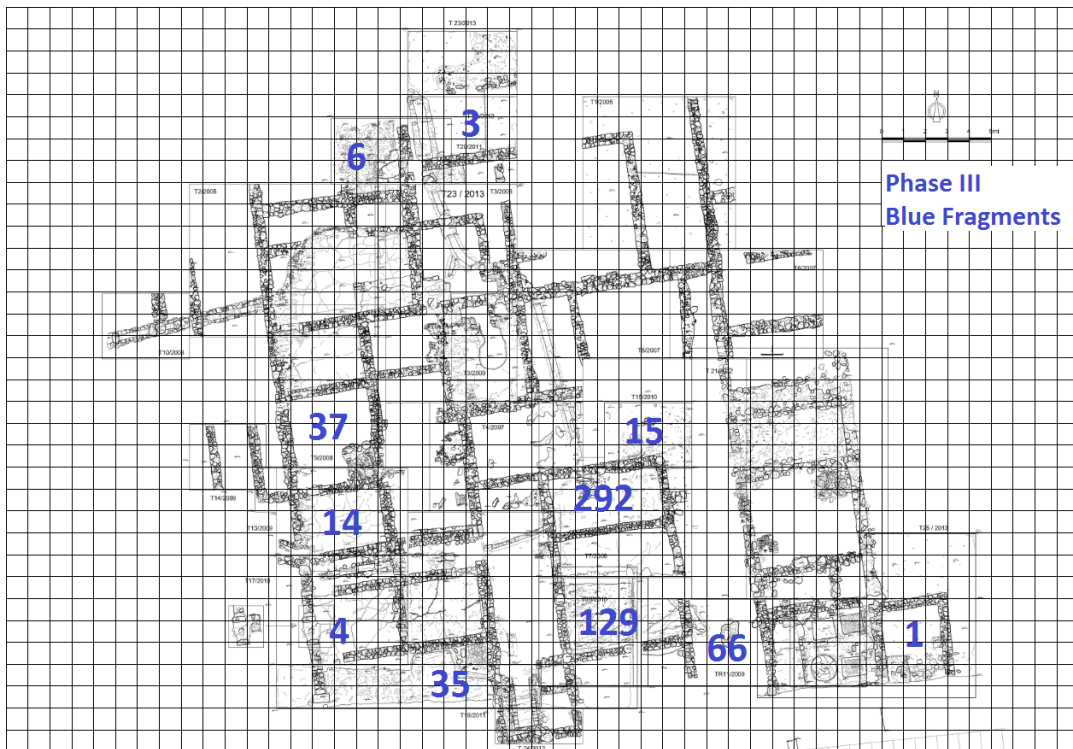
Map 5: This site map shows where each area in the villa being analysed is located.



Map 6: Spatial distribution of Phase 1 blue fragments found at the villa.



Map 7: Spatial distribution of Phase 2 blue fragments found at the villa.



Map 8: Spatial distribution of Phase 3 blue fragments found at the villa.

APPENDIX C: TABLES

	Date Range
Phase 1	Mid-1 st century BCE to last third of 1 st century CE/ early 1 st century CE
Phase 2	Last third to late 1 st century CE/ early 1 st century CE to late 1 st century CE
Phase 3	Late 1 st century CE to mid-2 nd century CE

Table 1: Date range table.

Phase 1	87
Phase 2	229
Phase 3	1187
Total Fragments	1503

Table 2: Total fragments table.

	Body	Handle	Rim	Base	Other	Total
Phase 1	63	1	19	4	0	87
Phase 2	182	1	27	9	10	229
Phase 3	969	10	136	67	5	1187
Total	1214	12	182	80	15	1503

Table 3: Quantification table.

	Blue	Green	Colourless	Yellow	Amber	Marble	White
P1	62	8	4	10	0	0	0
P2	142	31	23	14	8	1	3
P3	662	219	139	84	45	13	2
Total	867	257	166	108	53	14	5
	Brown	Painted	Red	Purple	N/A		
P1	0	0	2	0	1		
P2	2	0	0	1	4		
P3	3	3	1	1	15		
Total	5	3	3	2	20		

Table 4: Colour table. (N/A= no colour available).

	Minimum	Maximum	EVREP
P1	8	11	9.5
P2	9	11	10
P3	41	64	52.2
Overall	59	85	72

Table 5: EVREP table.

EVE/ DIA (CM)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	+	Total
P1				3		1	1	1						2		1	1	10
P2	1		1	1		2	1		1					1			3	11
P3	2	4	4	3	4	1	1	5	5	3		6	2	1	4	4	15	64

Table 6: Rim diameters of San Felice.

	Blue	Green	Colourless	Yellow	Amber	Marble	White
P3	662	219	139	84	45	13	2
	Brown	Painted	Red	Purple	N/A		
P3	3	3	1	1	15		

Table 7: Phase 3 colours.

	Total Fragments	Blue	Green	Yellow	Colourless	Red
P1	1					
P2	5	2	1	1		
P3	15	3	2		1	1

Table 8: Area 4 Table of colours.

	Area 5
Phase 1	2
Phase 2	9
Phase 3	55

Table 9: Area 5 table of fragments by phase.

APPENDIX D: FIGURES

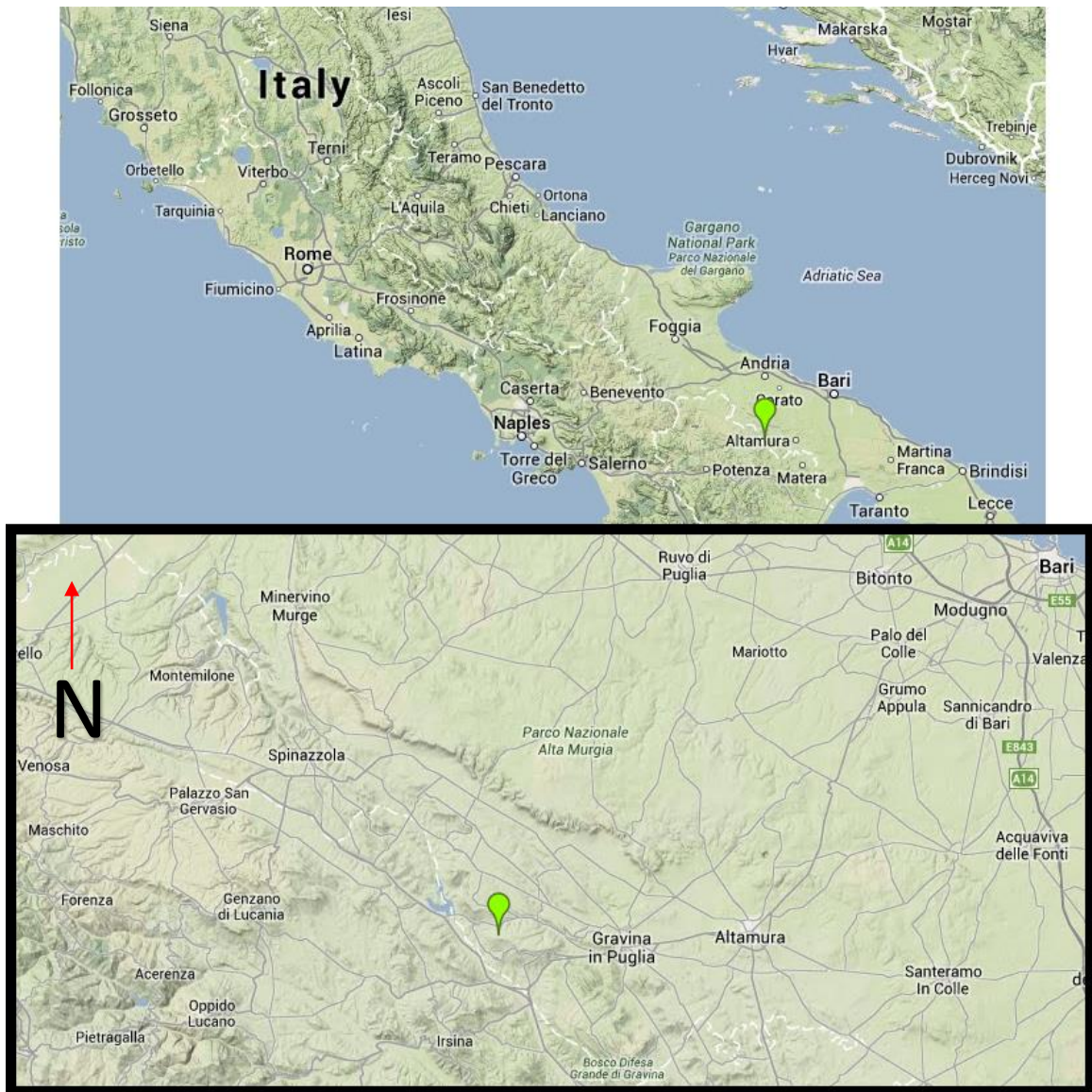


Figure 1: Map of southern Italy with San Felice marked with a tag.

San Felice 2013		Finds Record Form	
A. Category			
1- Pottery	6- Other Building Materials	11- Non-Metal Small Finds	
2- Roof Tile	7- Wall Plaster	<u>(2- Glass)</u>	
3- Flooring	8- Inscriptions	13- Bone & Shell	
4- Worked Stone	9- Coins	14- Charcoal/Other Samples	
5- Architectural Fragments	10- Metal	15- Other	
B. Classification			
Registry Number	<u>940-12-25004-13</u>	Date Processed	<u>23 July 2013</u>
Locus Number	<u>25004</u>	PB Number	<u>6</u>
Subcategory: <u>clear glass, rim</u>		Date Excavated	<u>4 July 2013</u>
C. Description			
			Group of <u>1</u> Pieces
Material: <u>glass</u>			
Length: <u>1.5cm</u>	Width: <u>0.9-1.1cm</u>	Thickness: <u>>0.1-0.2cm</u>	
Weight: <u>0.2g</u>			
D. Other Records			
Drawing(s) Made:	Yes	No	Date:
Photograph(s) Taken:	Yes	No	Date:
E. Comments & Identification			
<u>clear glass. rim fragment, solid rim. lots of bubbles. Body fragment is extremely thin, less than half of 1mm.</u>			
Registered by <u>Cena Kilback.</u>			

940-12-25004-13

Figure 2: Finds record form from the San Felice excavations.